The RUBBER AGE

November, 1941

TECHNOLOGY DEPT.

THE ULTRA ACCELERATORS

THIURAMS
and
DI-THIO-CARBAMATES
are
PLENTIFUL and CHEAPER

Their use both alone and also along with CAPTAX and ALTAX is growing rapidly.

For "UP TO THE MINUTE COMPOUNDING WITH ULTRA ACCELERATORS"—See Vol. 11—No. 5 of the Vanderbilt News.

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York City

1931 · NEOPRENE · 1941

1931 In Akron, Ohio, on the second day of November, three Du Pont chemists announced the development of a new synthetic rubber at a meeting of the Rubber Division of the American Chemical Society. They said, "Compared with natural rubber, this new synthetic rubber is more dense, more resistant to absorption or penetration by water, less strongly swelled by petroleum hydrocarbons and less permeable to gases. It is much more resistant to attack by oxygen, ozone, hydrogen chloride, hydrogen fluoride and many other chemicals."

In New York the price of rubber had fallen to 5¢ a pound. No one was interested in synthetic rubber tires. The samples of this new synthetic rubber displayed at the meeting in Akron had an offensive odor and were inferior to natural rubber in resistance to abrasive wear and certain other physical properties. Many of the rubber specialists present felt that these disadvantages outweighed its superior resistance to oils and chemicals. Not even the Du Pont chemists who announced the discovery could predict that within two years the first American synthetic rubber tires would be made from their new product.

But they could foresee that, because of its unique properties, it would find many new uses in American Industry despite its higher cost. So certain were they that at the time of the announcement in Akron, Du Pont had already built a plant costing several hundred thousand dollars for the commercial production of this new synthetic rubber.

The discovery was hailed everywhere as a brilliant scientific achievement, but few perceived that they were witnessing the birth of a new industry—the synthetic rubber industry.

1941 Ten eventful years have passed. The synthetic rubber that was described at the Akron meeting has been improved and refined. Its odor has been removed, and the product of today now excels natural rubber not only in chemical resistance but also in resistance to abrasive wear. Neoprene is being made at the rate of over a million pounds a month, and even that production is quite inadequate. Additional plants are under construction which will increase production to 3½ million pounds a month by the fall of next year.

Thousands of engineers in all branches of industry have played a significant part in this development. Working hand in hand with Du Pont, they have adapted it to thousands of uses for which natural rubber is unsuitable. Products formerly made of rubber have been improved when made of neoprene. Airplanes, automobiles, electrical equipment, pumps, conveying machinery, power transmission equipment—in fact, hundreds of products are better and more efficient because of neoprene. Without neoprene, hundreds of mechanical devices and tools that we use in our daily living, in our industries, and in the defense of our civilization would have to revert to the designs of former years.

No one can foresee what the next ten years will bring, but one may be sure that far-sighted engineers will adapt neoprene to many more new uses in which it will contribute to the efficiency of our production methods, our personal comfort and safety.

Put these facts together . . . use your imagination . . . then write your own prophecy because . . . while neoprene is ten years old and is backed by ten years of "know-how," it's really just beginning to grow.

DU PONT

REG. U.S. PAT. OFF.

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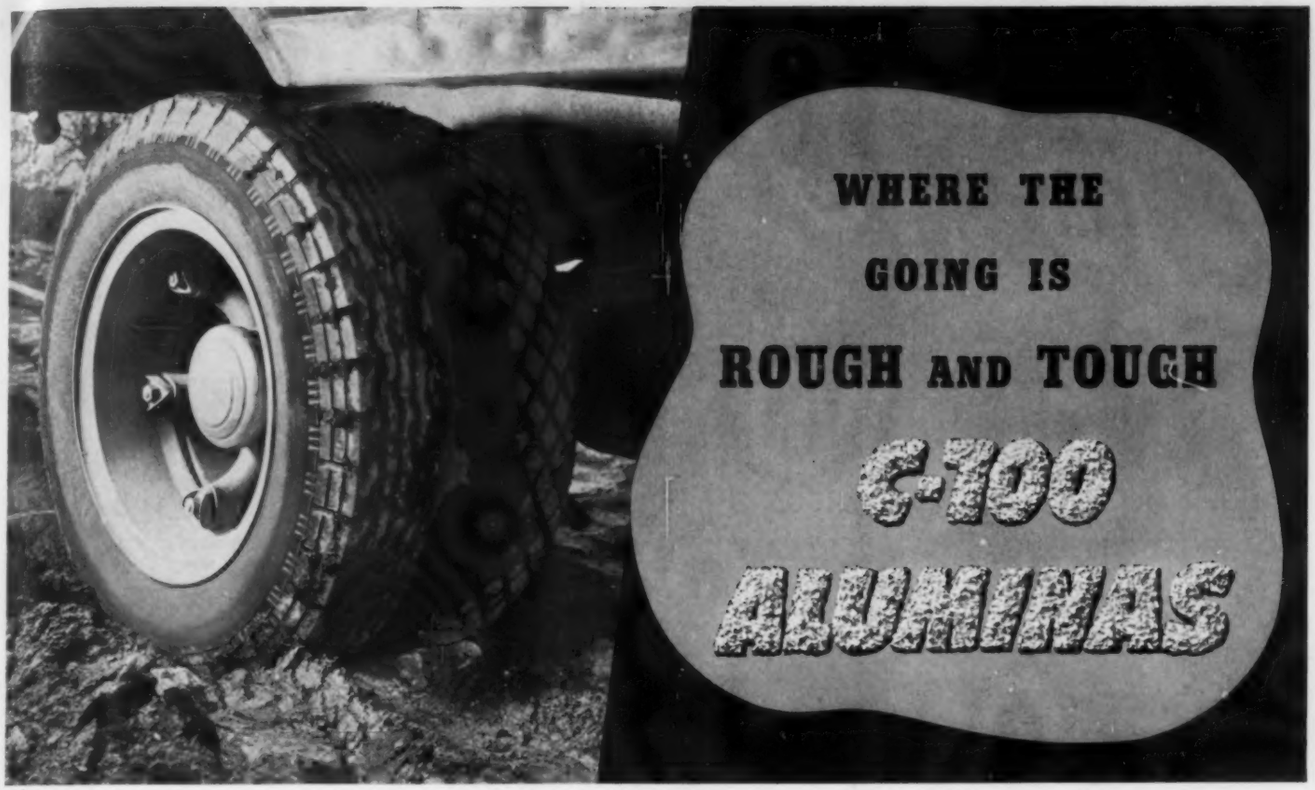

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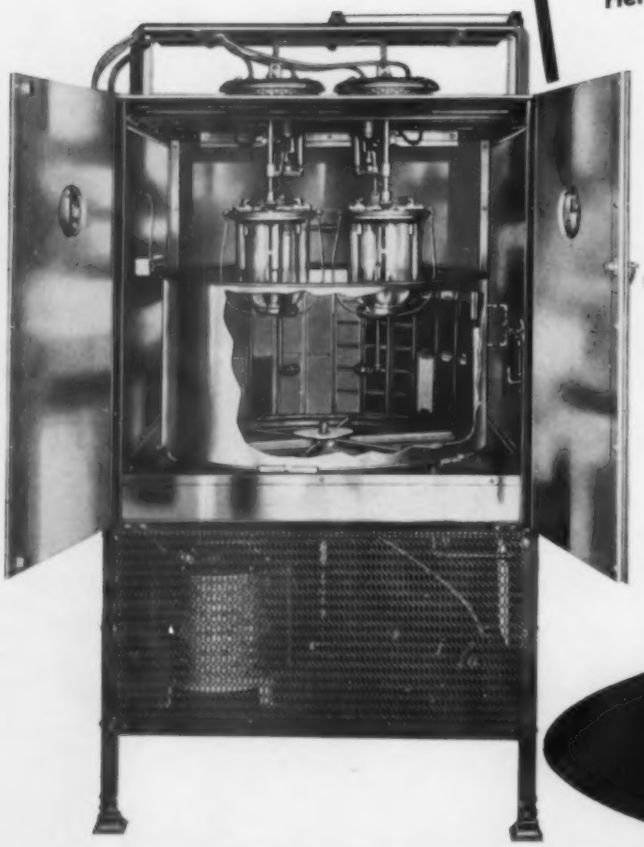

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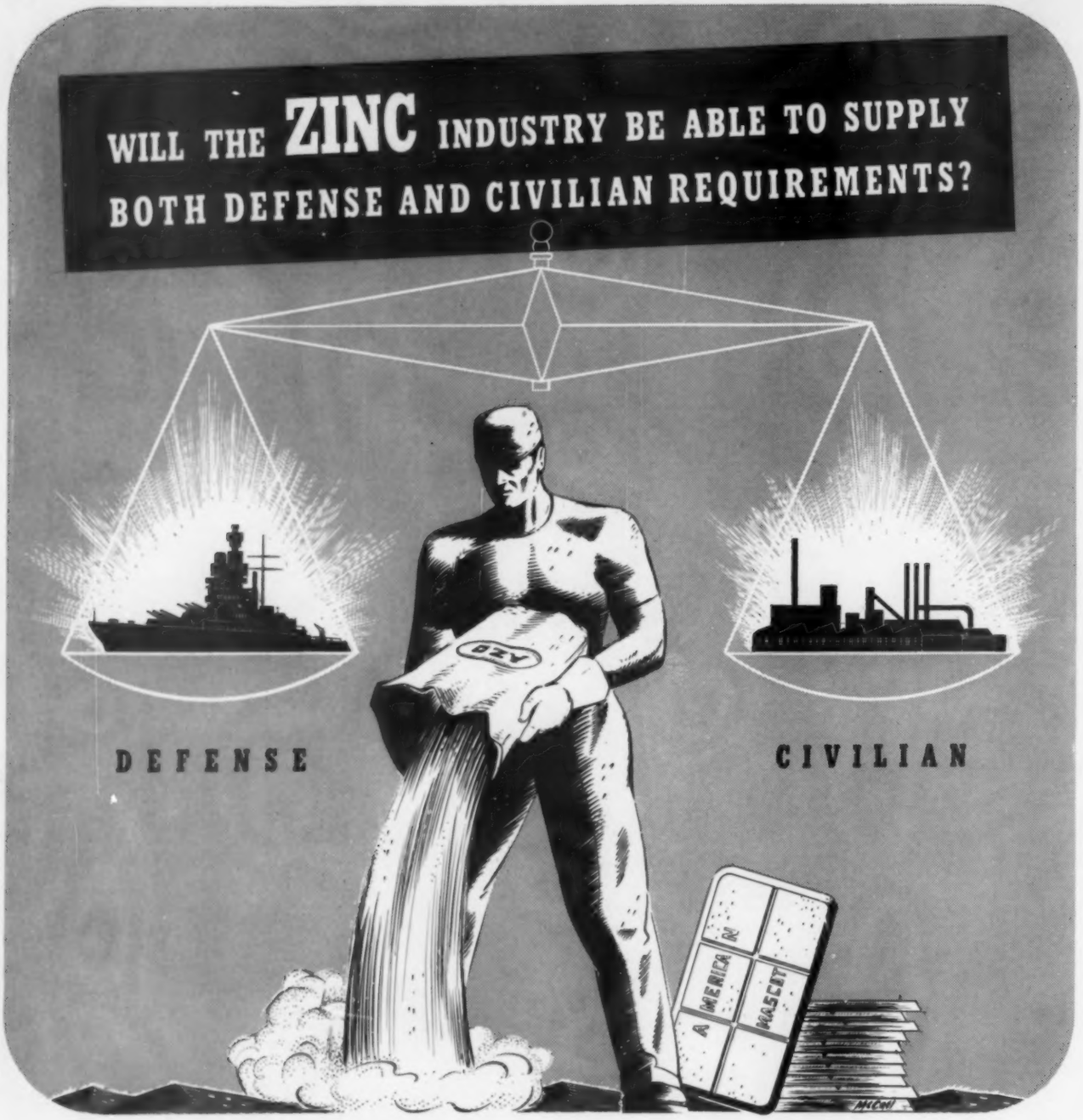

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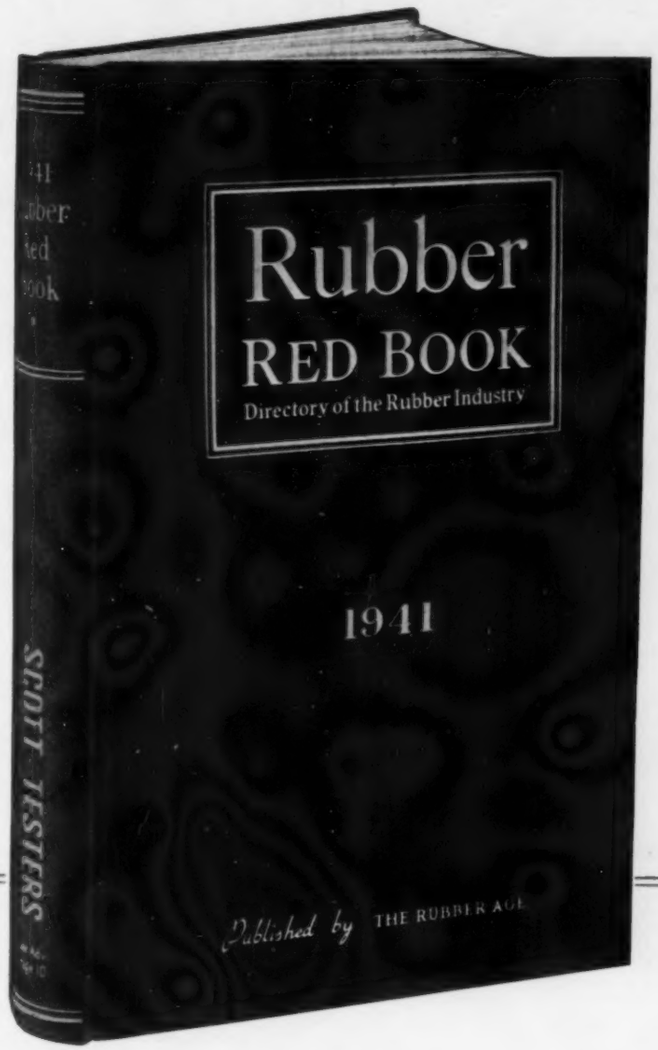

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To rubber factory executives, purchasing agents, technologists, etc., the RUBBER RED BOOK furnishes complete and handy lists of suppliers of all kinds of materials, equipment and services classified for easy reference. This is a service which saves buyers much time and effort as in no other directory are such lists available.

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ACCESSORIES AND FITTINGS
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Classified List of Materials; Trade and Brand Names; Suppliers and Addresses

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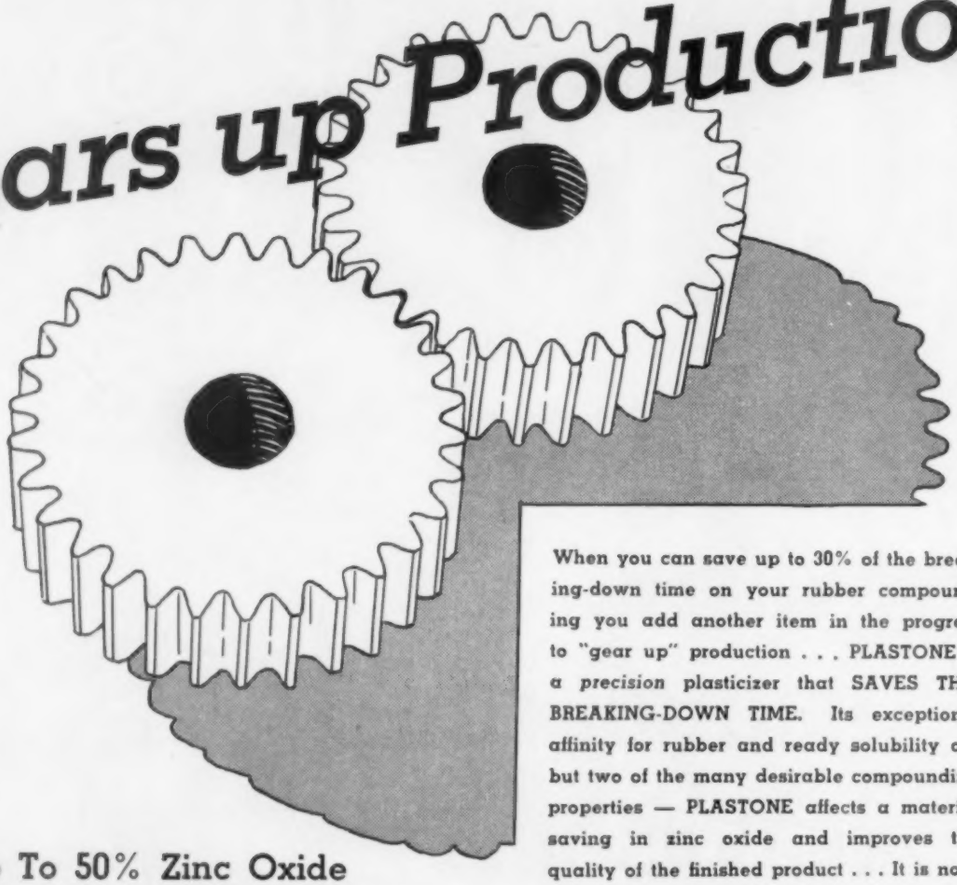

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Betanox — Very effective antioxidant with minimum residual odor in rubber and minimum discoloration of fabrics, lacquer, etc.

B-X-A — Powdered antioxidant used, for example, in tire treads and carcass, shoe soling, wire insulation, footwear.

V-G-B — First commercial non-accelerating antioxidant still widely used in molded products, roll covers, specification goods and Latex.

M-U-F — Minimum discoloration with highly effective antioxidant properties. Special resistance to the effects of copper and manganese. Also used in synthetic rubbers.

Without exception the above NAUGATUCK ANTIOXIDANTS have enjoyed widespread and successful use in the production of rubber goods. One of them, or a combination of two or more, will provide a satisfactory solution to practically any antioxidant problem.

Naugatuck Chemical

DIVISION OF UNITED STATES RUBBER COMPANY

ROCKEFELLER CENTER NEW YORK, N. Y.

The **RUBBER AGE**

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Light and Accelerated Light Aging of Rubber, Synthetic Rubber, and Rubber Substitutes

By T. A. WERKENTHIN[1] and D. RICHARDSON[2], R. F. THORNLEY[3] and R. E. MORRIS[4]

LIGHT aging tests were first included in procurement specifications for rubber deck matting. The evaluation of the aging specimens was entirely by visual examination; namely, to determine whether checking or cracking had resulted. A test specimen was supported during exposure on curved aluminum holders. The specimen was clamped in such a manner that a slight amount of flexing of the specimens occurred. In order to simplify the testing procedure a method developed by the authors was initiated, in which thin slabs of the material are used in special holders which would permit accurate elongation to the desired degree[5].

In addition to examination for checking and cracking, the deterioration of tensile strength was noted. Certain synthetics, such as Synthetic E for example, when subjected to exposure of 117½ hours, using a flaming ventilated arc with "Sunshine" or "C" carbons and Corex-D filters, showed no evidence of cracking or checking and the tensile strength in some instances increased slightly to 108 per cent of the initial[6]. The per cent elongation decreased only slightly to 94 per cent of the initial. This marked resistance to light aging is exceptional, and not at all typical of rubber or of all of the other synthetics.

In order to determine correlation between sunlight and accelerated light aging tests, a cooperative program was carried out with the Rubber Manufacturers Association, in which samples of commercial gasoline hose cover stocks and deck matting were subjected to natural aging and accelerated aging.

The exposures for accelerated aging in a flaming arc unit were made under conditions as follows:

Carbons	Filters	Material	Time of Exposure—Hours				
"U"	Corex D	Hose and Matting	100	200	300	400	500
"Sunshine"	Corex D	Hose and Matting	100	200	300	400*	500*
"Sunshine"	None	Hose only	24*	48	72	96*	120
"Sunshine"	None	Matting only	12	24	...	...	...

* Tests still under way.

Editor's Note: The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

(1) Materials Engineer, Navy Dept., Washington, D. C.

(2) Associate Materials Engineer, Navy Yard, Philadelphia, Penna.

(3) Assistant Engineer, Material Laboratory, Navy Dept., New York, N. Y.

(4) Rubber Technologist, Rubber Laboratory, Navy Yard, Mare Island, Calif.

(5) For complete data on the equipment and methods used the reader is referred to the article on "Equipment for Accelerated Light Aging of Rubber and Methods of Evaluation of Ultra-Violet Light and Sunlight," by the same authors, the first part of which appears in the November, 1941, issue of the *India Rubber World*, and the second part of which will appear in the December, 1941, issue of the same journal.

(6) "Sunshine," "C" and "U" carbons are the products of the National Carbon Co., Cleveland, Ohio; Corex-D filters are made by the Corning Glass Works, Corning, N. Y.

Exposures for natural aging were made at the Hialeah Exposure Station of the DuPont Company at Hialeah, Florida, (latitude 26 deg. N.), on 6 sets of test specimens which were designated for respective exposure periods of 60, 120, 180, 240, 300 and 360 days. The 60 and 120 day exposure specimens were reported to have received a total of 326.2 and 760.8 hours of sunshine, respectively. The results obtained are given in Tables I to V.

The exposures to accelerated aging in an Eveready X-1 unit were made using "U" carbons with Corex-D filters as well as "Sunshine" carbons with and without Corex-D filters. The data in Tables 1 and 2 on hose cover stock indicate that the "Sunshine" carbon exposure tests effected a greater degree of light aging in shorter time than the "U" carbons. Regarding the "Sunshine" carbons with and without Corex-D filters, it appears that without the filters the aging is accelerated but not to an extent to vitiate correlation with natural light aging. The matting materials covered in Tables 1 and 3 also show more rapid aging when exposed to "Sunshine" carbons without filters.

The test data obtained to date do not afford a definite indication of the period of exposure for acceler-

TABLE I—NATURAL AGING, FLORIDA
(Exposure Time, 45 deg.; Facing due South)

		Tensile Strength, lb./sq. in.			% of Initial	
			Aged, Days		Aged, Days	
		Initial	60	120	60	120
Gasoline Hose	1	2186	1591	1680	72.3	76.8
	2	1991	1522	1685	76.4	84.7
	3	1916	1735	1615	90.6	84.4
	4	1683	1243	1325	73.8	78.7
	5	1483	945	1178	63.7	79.4
	6	1323	1080	920	81.6	69.7
	7	754	284	263	47.6	34.8
Average*		1764	1351	1401	76.4	79.0
Rubber Deck Matting	1	3266	2447	2465	75.0	75.5
	2	2444	1600	1855	65.4	75.8
	3	2274	1307	1475	57.5	64.9
	4	1977	1272	1215	64.4	61.5
Average		2490	1657	1753	65.6	69.4
		Ultimate Elong., %			% of Initial	
Gasoline Hose	1	325	241	218	74.2	67.0
	2	250	250	225	100.0	90.0
	3	300	263	231	87.7	77.0
	4	287	231	218	80.5	75.9
	5	294	256	231	87.0	78.6
	6	313	218	218	69.7	69.7
	7	388	263	344	67.8	59.5
Average*		295	243	224	83.2	76.4
Rubber Deck Matting	1	494	406	418	82.1	84.6
	2	325	283	262	87.0	80.6
	3	375	262	250	69.9	66.7
	4	375	300	275	80.0	73.3
Average		392	313	301	79.8	76.3

* Exclusive of No. 7.

TABLE II—ACCELERATED AGING, FLAMING ARC UNIT

Corex "D" Panels Removed Sunshine Carbons		Tensile Strength, lb./sq. in. Aged, Hours			% of Initial Aged, Hours		
		48	72	120	48	72	120
Gasoline Hose.....	1	1728	1940	1850	78.9	88.6	84.5
	2	1473	1780	1710	74.1	86.4	85.9
	3	1278	1960	1540	66.7	102.3	80.4
	4	1215	1440	1520	72.2	85.4	90.3
	5	...*	...*	1270	...	...	85.6
	6	920	1080	1040	69.4	81.6	78.5
	7	325	320	135	43.2	42.4	17.9
Average**		1323	1628	1488	72.3	88.9	84.2
Corex "D" Panels in Place Sunshine Carbons		100	200	300	100	200	300
Gasoline Hose.....	1	1830	1660	1930	83.6	75.8	88.3
	2	1580	1980	1970	79.3	99.5	98.9
	3	1720	1805	1920	89.8	94.2	100.2
	4	1750	2020	1780	103.9	119.9	105.8
	5	1230	1490	1580	82.9	100.4	106.4
	6	1010	1350	1270	76.4	102.0	95.8
	7	510	530	660	67.7	70.3	87.5
Average**		1520	1718	1742	86.0	98.6	99.2
Corex "D" Panels in Place "U" Carbons		100	300	500	100	300	500
Gasoline Hose.....	1	2084	2415	2113	95.3	110.5	96.7
	2	1934	1915	2023	97.1	96.2	101.6
	3	1585	1938	1921	82.7	101.1	100.3
	4	1755	1681	1714	104.2	99.8	101.8
	5	1483	1500	1384	100.0	101.1	93.3
	6	1360	1227	1259	102.8	92.7	95.2
	7	655	496	590	86.9	65.8	78.2
Average**		1700	1780	1736	97.0	100.2	98.2
		Ultimate Elongation, %			% of Initial		
Corex "D" Panels Removed Sunshine Carbons		48	72	120	48	72	120
Gasoline Hose.....	1	289	281	238	82.8	86.4	73.2
	2	219	212	200	87.5	84.8	80.0
	3	231	228	218	77.1	79.3	72.7
	4	213	250	188	74.3	87.1	65.3
	5	*	*	212	...	...	72.0
	6	275	256	238	87.9	81.8	76.0
	7	338	320	228	87.1	82.5	81.3
Average**		242	247	216	81.9	83.9	73.3
Corex "D" Panels in Place Sunshine Carbons		100	200	300	100	200	200
Gasoline Hose.....	1	260	275	212	76.9	84.6	65.2
	2	188	250	250	75.2	100.0	100.0
	3	238	300	250	79.3	100.0	63.3
	4	263	225	200	91.5	78.2	69.6
	5	260	225	212	85.0	76.5	72.1
	6	163	262	213	52.1	83.6	68.1
	7	213	300	275	54.9	77.3	70.9
Average**		225	256	223	76.6	67.2	76.4
Corex "D" Panels in Place "U" Carbons		100	200	500	100	200	500
Gasoline Hose.....	1	250	275	228	76.9	84.6	73.2
	2	269	275	250	107.6	110.0	100.0
	3	244	275	276	81.3	91.7	91.7
	4	231	266	213	80.5	89.2	74.2
	5	225	258	250	76.5	87.8	85.0
	6	219	275	244	70.0	87.9	78.0
	7	369	300	325	95.1	77.3	83.8
Average**		240	269	245	82.1	81.9	83.7

* No test material available. ** Exclusive of No. 7.

ated aging or of the equivalent period of exposure for natural aging, after which an allowable degree of depreciation is found in the tensile strength and in ultimate elongation of rubber and synthetic rubber compounds. The correlation between accelerated and natural aging can be better determined when data in addition to the 60 and 120 day periods of natural exposure are available.

The sunlight resistance of some synthetic compounds depends to a large extent on the nature of the compounding. This is shown in the tables by the marked deterioration of a hose cover stock #7 made with Synthetic D. That this is not typical of this type of material may be seen by the results shown in Figure 4 showing oil and steam hose cover stocks made with Synthetic D-3. A stock compounded with Synthetic D showed no cracks or other visible changes and actually increased in tensile strength and also showed a slight increase in ultimate elongation after 40 hour exposure to unfiltered radiation to "Sunshine" carbon arc. These results would tend to emphasize the need for conducting light aging tests on all types of synthetic compounds in order to develop specific compounds of the various synthetics which show the highest resistance to sunlight aging.

The availability of certain synthetics has made it imperative to utilize to the fullest extent each and every one of the desirable properties of the synthetics. Now that the use of natural rubber is restricted, as well as that of synthetic rubbers, in order to build up a national reserve, it is of the utmost importance to study compounding of synthetics in order to take advantage of all of the properties, one of them being

Key to the Identification of Synthetic and Substitute Rubbers

Synthetic A—Ameripol or Hycar
Synthetic B—Butyl Rubber
Synthetic C—Chemigum
Synthetic D—Thiokol
- D-1—Thiokol F
- D-2—Thiokol FA
- D-3—Thiokol Synrub
- D-4—Thiokol RD

Synthetic E—Neoprene
- E-1—Neoprene I
- E-2—Neoprene GW
- E-3—Neoprene GN

Synthetic F—Buna N
- F-1—German Type
- F-2—Standard Oil Type

Substitute G—Guayule
- G-1—Domestic Deresined
- G-2—Domestic Resinous
- G-3—Mexican Resinous

Synthetic H—Vistanex
Synthetic I—Buna S

Table III

Accelerated Aging, Flaming Arc Unit

Corex "D" Panels Removed Sunshine Carbons		Tensile Strength, lb./sq. in. Aged, Hours				% of Initial Aged, Hours			
		12	24	12*	24*	12	24	12*	24*
Rubber Deck Matting	1	640	0	1893	1425	19.6	0	59.0	43.6
	2	590	990	1453	863	24.1	40.6	59.4	35.3
	3	410	480	715	310	18.0	21.2	31.4	13.6
	4	440	1470	438	22	22.2	74.3	32.1	1.1
Average		520	735	1125	655	21.0	34.0	42.7	23.4
Corex "D" Panels in Place Sunshine Carbons		100	200	300	100	200	300		
Rubber Deck Matting	1	2140	2840	1870	65.5	86.9	57.3		
	2	2090	1970	1750	85.5	80.5	71.7		
	3	1540	1840	1850	67.8	81.0	81.5		
	4	1600	1890	1890	80.4	94.9	96.4		
Average		1840	2132	1840	74.8	85.8	76.4		
"U" Carbons		100	300	500	100	300	500		
Rubber Deck Matting	1	2733	2698	2604	93.4	82.6	97.7		
	2	2212	2165	2523	90.5	88.6	103.2		
	3	1982	1822	1992	87.2	80.1	87.6		
	4	1885	1729	1816	95.3	87.5	91.9		
Average		2200	2104	2234	89.1	84.7	90.6		

Light Aged Flaming Arc Unit

Corex "D" Panels Removed Sunshine Carbons		Ultimate Elongation, %				% of Initial			
		12	24	12*	24*	12	24	12*	24*
Rubber Deck Matting	1	363	0	419	344	74.5	0	84.9	69.7
	2	256	188	250	163	78.7	57.8	76.9	50.1
	3	206	126	213	113	55.0	33.3	66.8	30.1
	4	100	368	213	21	26.6	90.1	56.8	8.3
Average		233	163	274	163	59.7	45.3	68.9	39.6
Corex "D" Panels in Place Sunshine Carbons		100	200	300	100	200	300		
Rubber Deck Matting	4	300	438	362	60.7	88.6	73.3		
	3	275	275	225	84.6	84.6	69.5		
	8	275	312	275	73.4	83.2	73.4		
	1	325	380	275	86.6	93.3	73.4		
Average		294	344	284	76.3	87.4	72.4		
"U" Carbons		100	300	500	100	300	500		
Rubber Deck Matting	4	475	463	444	96.2	93.7	89.9		
	3	306	281	294	94.2	86.6	90.5		
	8	350	313	331	93.3	83.5	88.5		
	1	263	350	338	96.8	93.3	90.1		
Average		374	352	352	95.1	89.3	89.7		

* Check test with adjustable jig.

TABLE IV—VISUAL EXAMINATION OF GASOLINE HOSE
(Binocular Microscope, 22.5x)

Test Condition and Specimen		Condition of Exposed Surface: Crazing or Checking	Cracking	Discoloration
Natural Aging, Florida		Aged, 120 Days		
Gasoline Hose	1	slight	———	———
	2	slight	———	———
	3	slight	———	———
	4	slight	———	purple
	5	slight	———	gray
	6	slight	———	mottled purple
	7	slight	———	gray
Accelerated Aging, Flaming Arc Unit				
Sunshine Carbons-Corex "D" Panels Removed		Aged, 120 Hours		
Gasoline Hose	1	slight	———	purple streaks
	2	slight	———	purple streaks
	3	slight	———	purple
	4	slight	———	purple
	5	slight	———	gray
	6	slight	———	purple
	7	slight	———	gray
Sunshine Carbons-Corex "D" Panels in Place		Aged, 200 Hours		
Gasoline Hose	1	slight	———	purple
	2	slight	———	purple
	3	———	———	mottled
	4	slight	———	purple
	5	———	———	gray
	6	slight	———	mottled
	7	———	———	gray
"U" Carbons-Corex "D" Panels in Place		Aged, 500 Hours		
Gasoline Hose	1	slight	slight	purple
	2	slight	———	brown & purple
	3	slight	———	gray
	4	———	———	purple
	5	———	slight	gray
	6	———	———	purple
	7	———	———	gray

resistance to light. With certain exceptions, synthetic rubbers were used in the past primarily for their oil-resisting properties. Their resistance to weathering and their resistance to abrasion were considered of secondary importance.

Excellent light aging is indicated by various stocks made from Synthetic D-1 and D-2 by blends of Synthetic D-1 and D-2 with various proportions of Hevea rubber. (See Figure 2 where the effect of the addition of large quantities of rubber is clearly shown). Certain rubber substitutes, such as G, have been extensively tested to determine their light aging resistance. Soft gasket stocks were prepared of rubber and Substitute G. The comparative results of checking are shown in Figure 1.

The extent of cracking and checking of comparable types of wire insulation and steam hose compounds made with smoked sheet and with Substitute G-1, G-2 and G-3 are indicated in Figure 6. Additional tests were made on Substitute G with various types of primary and secondary accelerators in which the light aging resistance was measured. These tests indicate that with special compounding and capable selection of accelerators and anti-oxidants light aging properties may be improved to a much greater extent with Substitute G than has been found possible with natural rubber. Thus, under the same conditions of exposure, that is, 56 hours at 20 per cent elongation to the unfiltered radiation from "Sunshine" carbons, the change in tensile strength for smoked sheet was 62 per cent, whereas the change for similar compounds made with Substitute G-1 was only 21, 27, and 30 per cent, respectively.

The investigation on the resistance to light aging has not been restricted, however, to hose cover stocks and matting, but includes a variety of other materials, particularly latex cement decking materials. These latter

TABLE V—VISUAL EXAMINATION OF RUBBER DECK MATTING
(Binocular Microscope, 22.5x)

Test Condition and Specimen		Condition of Exposed Surface: Crazing or Checking	Cracking	Discoloration
Natural Aging, Florida		Aged, 120 Days		
Rubber Deck Matting	1	Considerable	———	———
	2	Considerable	———	———
	3	Considerable	———	———
	4	———	Considerable	———
Accelerated Aging, Flaming Arc Unit				
Sunshine Carbons-Corex "D" Panels Removed		Aged, 24 Hours		
Rubber Deck Matting	1	Considerable	Considerable	———
	2	———	Considerable	———
	3	Considerable	Excessive	———
	4	———	Excessive	———
Sunshine Carbons-Corex "D" Panels in Place		Aged, 200 Hours		
Rubber Deck Matting	1	Slight	Slight	———
	2	———	Slight	Gray
	3	Slight	———	Gray
	4	Slight	———	———
"U" Carbons-Corex "D" Panels in Place		Aged, 500 Hours		
Rubber Deck Matting	1	Slight	———	Purple
	2	Slight	———	———
	3	Slight	———	Speckled
	4	Slight	———	———

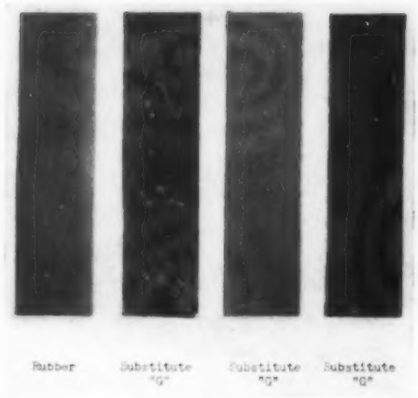


Fig. 1—Soft gasket stocks exposed at 20% elongation for 56 hours to unfiltered radiation from "Sunshine" carbon arc in an Eveready X-1A unit.

materials may be judged by fading and cracking, but more satisfactorily by measurement of changes in resistance to abrasion and wear, as well as moisture absorption. Among other materials tested was the cellular type of hard rubber. Here, of course, evaluation could not be based on decrease of tensile strength, but evaluation was made on the basis of increase in water absorption of the exposed specimen over the water

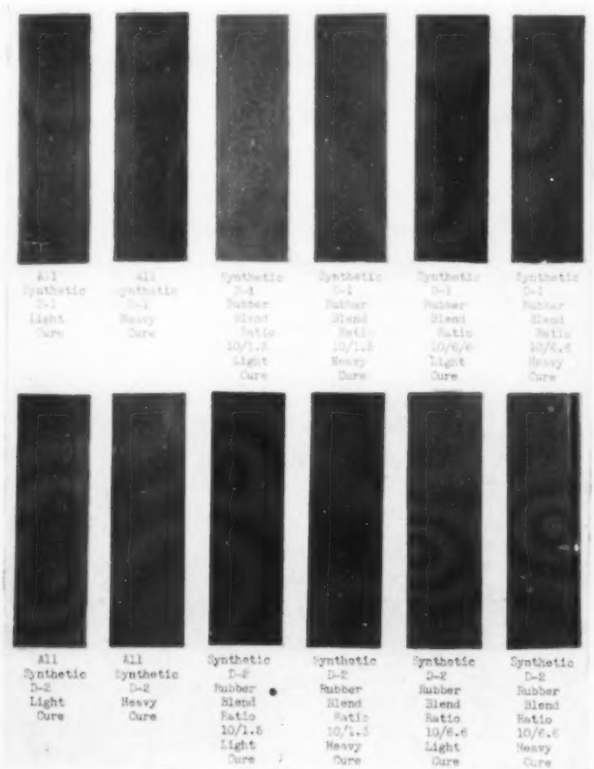

All Synthetic D-2 Light Cure
All Synthetic D-2 Heavy Cure
Synthetic D-2 Rubber Blend Ratio 10/1.6 Light Cure
Synthetic D-2 Rubber Blend Ratio 10/1.6 Heavy Cure
Synthetic D-2 Rubber Blend Ratio 10/6.6 Light Cure
Synthetic D-2 Rubber Blend Ratio 10/6.6 Heavy Cure

Fig. 2—Oil hose cover stocks at 20% elongation after 100 hours to unfiltered radiation from "Sunshine" carbon arc.

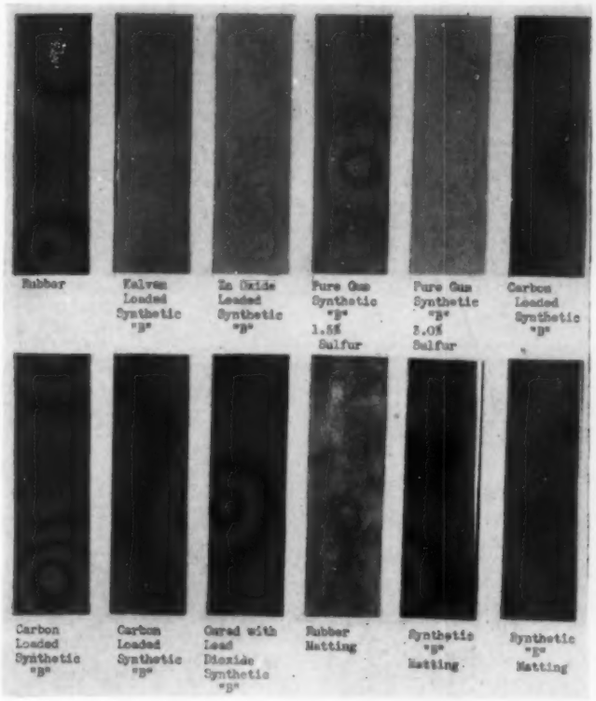

Rubber
Kalvan Loaded Synthetic "B"
Zn Oxide Loaded Synthetic "B"
Pure Gum Synthetic "B" 1.5% Sulfur
Pure Gum Synthetic "B" 3.0% Sulfur
Carbon Loaded Synthetic "B"
Carbon Loaded Synthetic "B"
Carbon Loaded Synthetic "B"
Cured with Lead Dioxide Synthetic "B"
Rubber Matting
Synthetic "B" Matting
Synthetic "B" Matting

Fig. 3—Soft gasket stock exposed at 20% elongation for 56 hours to unfiltered radiation from "Sunshine" carbon arc in an Eveready X-1A unit.

absorption of the unexposed specimen. Figure 5 indicates the effect of exposure to sunlight of cellular hard rubber when covered with canvas and when exposed direct. Peculiarly enough, the samples which were not covered with canvas showed consistently better resistance to light and lower water absorption rates than specimens that were covered with canvas.

An interesting comparison of the behavior of various synthetics compared to natural rubber was obtained in specimens in which identical stocks were prepared using natural rubber, Synthetic B and Synthetic E. As may be seen from the group photograph, Figure 3, the nature of the compounding of the synthetic is tremendously important in effecting proper resistance to sunlight. Thus, pure gum Synthetic B is shown with one and one half per cent sulfur and three per cent sulfur, respectively. These compounds have considerable resistance to sunlight as have compounds made with Synthetic B which are loaded with zinc oxide or Kalvan. On the other hand, Synthetic B compounded with reinforcing and non-reinforcing carbon blacks shows considerable cracking. This again indicates that the methods used in compounding natural rubber stocks may not directly be applied to synthetic rubbers and that sometimes an entire reversal of experience is obtained, as in the above illustrations. We have here the unusual condition of a carbon black compound which shows poor aging resistance and the same synthetic compounded with zinc oxide or cured with lead dioxide which shows remarkably good sunlight resistance.

It would appear desirable to make available to all interested manufacturers the extensive information accumulated over several years in regard to compounding of synthetics for the purpose of obtaining mate-

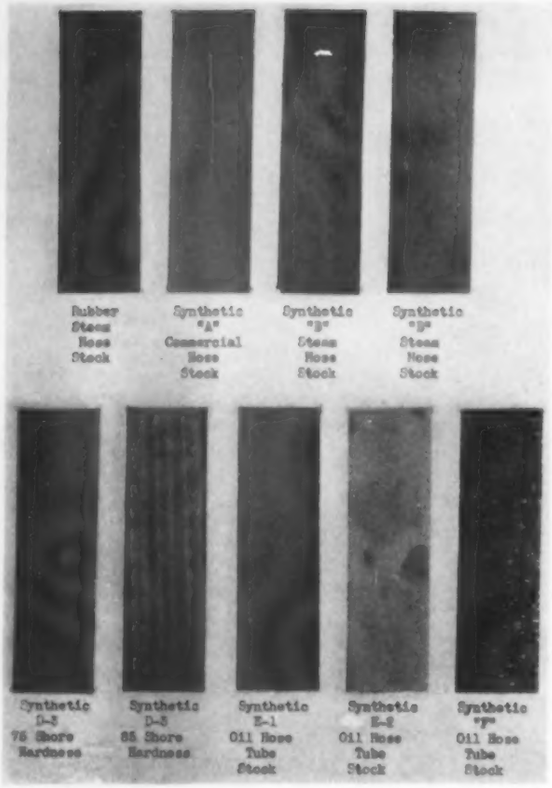

Rubber Steam Hose Stock
Synthetic "A" Commercial Hose Stock
Synthetic "B" Steam Hose Stock
Synthetic "D" Steam Hose Stock
Synthetic D-5 75 Shore Hardness
Synthetic D-5 85 Shore Hardness
Synthetic E-1 Oil Hose Tube Stock
Synthetic E-2 Oil Hose Tube Stock
Synthetic "F" Oil Hose Tube Stock

Fig. 4—Steam and oil hose stocks exposed to 40 hours at 20% elongation to unfiltered radiation from "Sunshine" carbon arc.

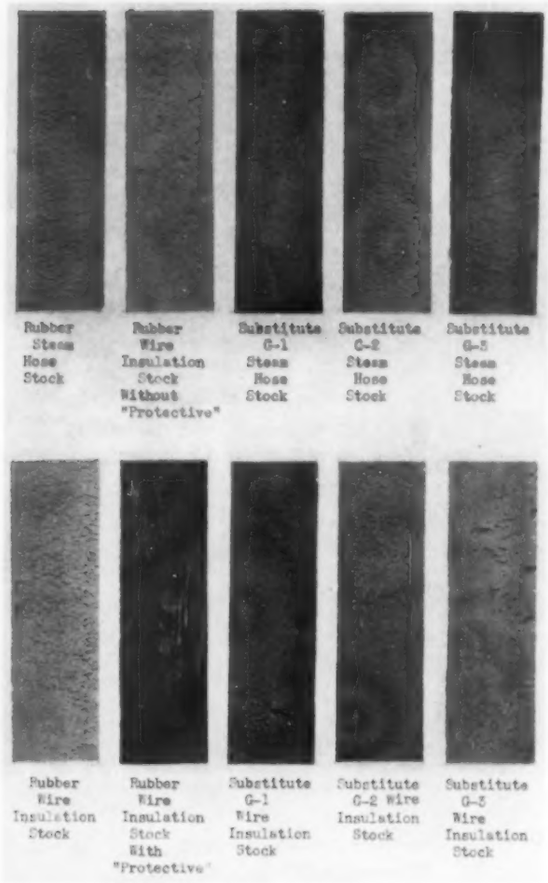

Rubber Steam Hose Stock
Rubber Wire Insulation Stock Without "Protective"
Substitute G-1 Steam Hose Stock
Substitute G-2 Steam Hose Stock
Substitute G-5 Steam Hose Stock
Rubber Wire Insulation Stock
Rubber Wire Insulation Stock With "Protective"
Substitute G-1 Wire Insulation Stock
Substitute G-2 Wire Insulation Stock
Substitute G-5 Wire Insulation Stock

Fig. 6—Steam and oil hose and wire insulation stocks exposed 40 hours at 20% elongation in Everady X-1A unit to unfiltered radiation from "Sunshine" carbon arc.

rials which not only meet the normal physical and chemical requirements of hose and matting stocks, but also are exceptionally resistant to sunlight and weathering. It is believed that making this dissemination and exchange of information by and to the industry as a whole would naturally aid the manufacturers in their difficult problem of making more and more rubber articles to close requirements in order to conserve natural rubber and make it "go as far as possible."

What a wide field this opens for research work in order to make the most of each of the synthetics and of the various rubber substitutes! It will be noted that in most of the rubbers the decrease in tensile and the per cent elongation may be considered as a primary criterion on which to base evaluation of the rubber or synthetic rubber compound. It is interesting to note that test specimens which do not show visual deterioration such as checking or cracking do show appreciable decrease in tensile strength. It appears, therefore, that the change in physical properties such as a decrease in the tensile strength and the decrease in the per cent elongation is a more satisfactory means of judging the light resistance of rubber than the appearance of exposed surface.

Another advantage of using the tensile strength and per cent elongation change as criteria in evaluation of rubber stocks is that these changes in rubber or most synthetic rubbers occur sooner than the other physical changes such as cracking and checking, so that if time is a factor, tensile strength decrease may be used as the sole indication of satisfactoriness of the material as far as light resistance is concerned.

(To Be Concluded Next Month)

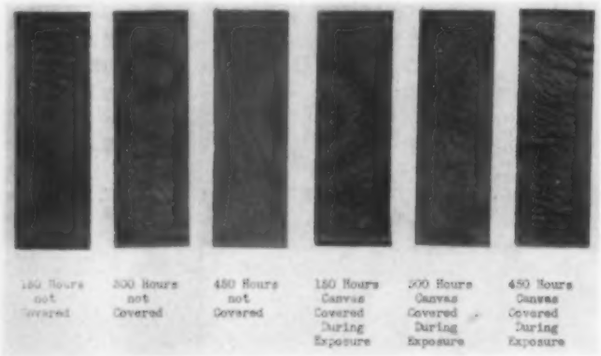

150 Hours not Covered
300 Hours not Covered
450 Hours not Covered
150 Hours Canvas Covered During Exposure
300 Hours Canvas Covered During Exposure
450 Hours Canvas Covered During Exposure

Fig. 5—Cellular hard rubber exposed to accelerated light and weather aging in Everady X-1A unit, using "U" carbons and Corex-D filter panels. Photographed face is face directly exposed to light rays.

A Manometric Test for Oxygen Absorption by Vulcanized Rubber

By ROBERT H. JOHNSON

R. T. Vanderbilt Co., Laboratory, East Norwalk, Conn.

ABSTRACT

THE Dufraisse manometric method for determining the rate of oxygen absorption by vulcanized rubber was used with some modification to determine the absorption rates of four compounds whose aging characteristics in the oxygen bomb were already known. The chief difference between this modified method and that of Dufraisse is that the sample used consisted of a number of die cut T-50 specimens.

A second modification is that the apparatus consists of one or more sealed glass reaction chambers containing the samples in oxygen at atmospheric pressure and at 100° C. A mercury manometer tube with a millimeter scale is attached to each reaction chamber to permit the measurement of the reduction of pressure due to the absorption of oxygen. Readings of the heights of the mercury columns are taken at regular intervals. The data obtained during a reaction period of one to two hours are sufficient to define the absorption rates quite closely. The actual amount of oxygen absorbed is not determined, but is presumed to be very small—that is, a small fraction of one per cent by weight on the rubber content of the compound.

The absorption rate curves for the various compounds fall in the same relative positions as do the tensile strength deterioration rate curves for the same compounds aged in the oxygen bomb. Furthermore, the differences between the four compounds are greater as judged by an inspection of the absorption rate curves than as judged from an inspection of the tensile deterioration rate curves, when both sets of curves are comparably plotted.

The advantage of the method is its speed.

THE object of this work was: (1) to set up in laboratory glass ware an apparatus which might confirm the results obtained by Dufraisse in his manometric test for oxygen absorption using metal apparatus; (2) to study the relative tendencies of different rubber compounds to absorb oxygen; (3) to determine the relationship between the rates of oxygen absorption of rubber compounds by the modified Dufraisse method and their rates of tensile strength deterioration in the oxygen bomb.

NOTE: This article, presented before the New York Group, Rubber Division, A.C.S., on October 17, was awarded second prize in the 1941 Papers Contest sponsored by that group.

Apparatus

The apparatus (Fig. 1) consists of one or more sealed glass reaction chambers which contain the samples in an atmosphere of oxygen, and are immersed in an oil bath maintained at 100° C. A mercury manometer tube with a millimeter scale is attached to each reaction chamber to permit the measurement of the reduction of pressure.

The reaction chambers are made of heavy walled Pyrex glass. The outside dimensions are 3.5 inches in height by .875 inch in diameter. The capacity is about 25 cubic centimeters. Each chamber is sealed with a tapered well greased ground glass stopper.

Passing through the center of this stopper is a length of small diameter glass tubing which reaches to the bottom of the reaction chamber, thus allowing the oxygen to be introduced there. At the top of the reaction chamber there is a side arm with a three way stop-cock so that the air and the oxygen used in flushing out the chamber may be vented through its core. To this side arm is connected the manometer tube.

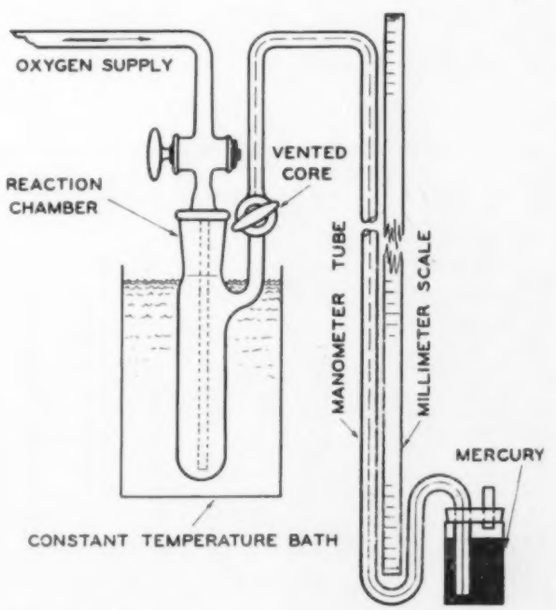


Fig. 1—Schematic Arrangement of Oxygen Absorption Apparatus.

Procedure

Die out as many T-50 pieces from each slab of rubber compound to be tested as may readily be accommodated by one reaction chamber, and weigh. Stand these pieces upright side by side in the reaction chamber. Grease all the stop-cocks and all the ground glass fittings with a good grade of white petrolatum to prevent leakage. Now immerse the reaction chambers containing the samples in the constant temperature oil bath and connect them with the oxygen supply. Allow a slow current of oxygen to pass through for ten minutes to be sure the inside atmosphere consists of oxygen only. Now stop the flow of oxygen and immediately close all the stop-cocks on the reaction chambers.

Connect the manometer tubes to the side arms of the reaction chambers and open the stop-cocks to the manometer tubes. As the temperature within the reaction chambers rises the mercury level in the manometer tubes will be depressed until the final temperature of 100° C. is reached throughout. Open the vent cock on each chamber to the room to reduce the pressure within the reaction chambers to atmospheric. This will cause a rise in the height of the columns of mercury.

The readings at this point are taken as the zero points. Readings of the millimeter scale are taken each five minutes during the first hour and each fifteen minutes during the second hour. At the end of two hours enough readings have been taken to define the relative rates at which the rubber compounds absorb oxygen.

Compounds Used in Oxygen Absorption Tests

	A	B	C	E
Smoked Sheet	100	100	100	100
Stearic Acid	1	1	1	1
Zinc Oxide	56	56	56	56
Gilder's Whiting	54	54	54	54
Agerite White	—	—	—	1
Agerite Resin D	—	1	—	—
Sulfur	3	3	1	—
Altax	1	1	1	—
Zimate	0.1	0.1	—	—
Tuads	—	—	0.3	3
Telloy	—	—	—	0.5
Curing Temperature	287°F.	287°F.	258°F.	274°F.

Tensile Properties

Stress at 300% (S)—Tensile (T)—% Elongation at Break (E)
Before Aging

Press Cures of Slabs	A S	A T	A E	B S	B T	B E	C S	C T	C E	E S	E T	E E
10 Minutes	Uncured			Uncured			...	....	...	...	....	...
15 Minutes	...	....	...	...	....	...	...	....	...	475	2180	620
20 Minutes	890	2680	600	860	2650	580	Uncured			...	....	...
30 Minutes	780	2500	600	740	2600	600	Slightly Cured			710	2560	560
40 Minutes	...	....	...	...	....	...	870	2640	560	...	....	...
45 Minutes	710	2350	610	700	2370	600	...	....	...	790	2600	540
50 Minutes	...	....	...	...	....	...	850	2640	520	...	....	...
60 Minutes	720	1960	570	715	2065	590	845	2355	500	790	2540	520

After Aging in Oxygen Bomb (70° C. and 300 lbs. oxygen)

Cure Used (°F)	30 Min. at 287 S	T	E	30 Min. at 287 S	T	E	40 Min. at 258 S	T	E	45 Min. at 274 S	T	E
2 days of aging	770	2030	540	905	2290	540	850	2550	520	735	2280	520
4 days of aging	700	1735	530	985	1950	510	815	2500	525	765	2250	525
7 days of aging	720	1530	500	900	1840	490	890	2350	500	870	2220	500
14 days of aging	...	535	220	880	1140	380	850	1980	500	850	2040	490
21 days of aging		Melted		...	730	280	810	1810	490	850	1980	480
28 days of aging	...	....	...	...	650	230	610	1230	490	730	1640	480

Note: The oxygen bomb aging data shown above were taken from *Vanderbilt News*, Vol. 11, No. 2, p. 5, 1941.

Discussion of Procedure

The rate of oxidation of a sample of given volume is a function of the surface area of that sample. Theoretically, the smaller the particles of a finely divided sample the faster the oxidation. If the particles are too fine, however, too many of the surfaces will touch and will therefore not have good oxygen contact. Also there will be air trapped between the particles that will not be replaced by oxygen. Conversely, if the particles are too large the surface area per volume will be too small for speedy results.

After several trial runs with samples prepared in various ways, T-50 specimens were chosen as the best type of sample, because they seemed to give the most favorable surface-volume ratio. T-50 pieces totaling 6.6 grams also gave a suitable ratio of volume of sample to volume of reaction chamber to produce reasonably quick and accurate results. All succeeding tests were run with this weight of sample. Each of the

Height of Mercury Column in Millimeters During Test

Curing Temp.	A 287° F.						B 287° F.					C 258° F.				E 274° F.			
Time of Heating of Samples at 100° C. / Curing Time	20′	30′		45′		60′	20′	30′	45′	60′		30′	40′	50′	60′	15′	30′	45′	60′
	Millimeters						Millimeters					Millimeters				Millimeters			
0 Minutes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Minutes	4	5	7	2	1	6	5	2	1	1	3	0	1	1	..	..	..	..	..
10 Minutes	10	11	12	6	5	12	9	4	3	4	6	1	3	4	..	..	..	..	..
15 Minutes	18	20	21	12	11	18	13	6	5	7	9	1	4	7	1	1	1	4	
20 Minutes	26	28	27	18	17	24	16	8	8	10	12	2	6	10	..	..	..	..	
25 Minutes	40	37	36	24	22	30	17	10	10	13	14	2	8	13	..	..	..	..	
30 Minutes	48	42	42	29	27	36	21	14	13	16	16	3	10	15	1	2	3	11	
35 Minutes	57	48	48	35	32	42	23	17	15	18	19	4	12	18	..	..	..	..	
40 Minutes	66	56	56	41	38	48	27	21	16	21	21	5	14	21	..	..	..	..	
45 Minutes	76	64	63	45	43	53	32	24	18	23	24	5	16	24	1	3	5	21	
50 Minutes	85	71	71	50	48	58	35	25	20	26	27	6	17	26	..	..	..	..	
55 Minutes	92	79	79	56	54	65	37	28	23	30	29	7	19	29	..	..	..	..	
60 Minutes	100	86	85	62	60	70	42	32	26	32	32	8	20	31	1	5	8	30	
75 Minutes	123	106	105	79	77	..	52	42	34	39	40	10	24	40	3	7	10	39	
90 Minutes	..	..	..	95	91	..	58	49	42	47	47	12	28	49	4	9	12	46	
105 Minutes	..	..	..	111	107	..	66	58	47	54	53	14	33	56	5	12	..	..	
120 Minutes	..	..	..	127	124	..	76	66	53	60	60	16	38	65	6	13	..	..	
135 Minutes	..	..	..	..	..	151	84	72	60	67	66	19	44	74	7	15	..	..	
150 Minutes	..	..	..	..	..	..	94	83	65	73	72	22	51	83	8	17	34	76	
165 Minutes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	20	36	81	
180 Minutes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11	22	39	90	

Slightly Cured

four compounds used in this test has the same specific gravity and therefore each sample had the same volume. Since die cut specimens were used each sample had not only the same volume but the same surface area.

Compounds Used

The compounds used in these oxygen absorption tests are the same as four of the five used by the Vanderbilt Laboratory in correlating oxygen bomb aging at 70° C. and 80° C. (See the *Vanderbilt News*, 1941, Volume 11, No. 2, pp. 4 to 10, Compounds A, B, C and E).

Duplicate determinations on Compound A cured 30 minutes were run simultaneously in separate chambers. Duplicate determinations on Compound A cured 45 minutes were made in the same manner. The splendid check results obtained show that one reaction chamber duplicates the other.

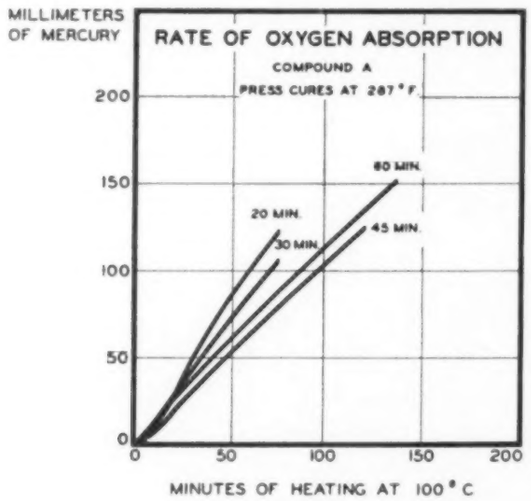
Similarly, duplicate determinations on Compound B cured 60 minutes were run five days apart. The excellent check results show that a test made one day may be duplicated later.

The accompanying graphs show the curves for the rate of oxygen absorption for the various cures by the four compounds listed above.

Discussion of the Graphs

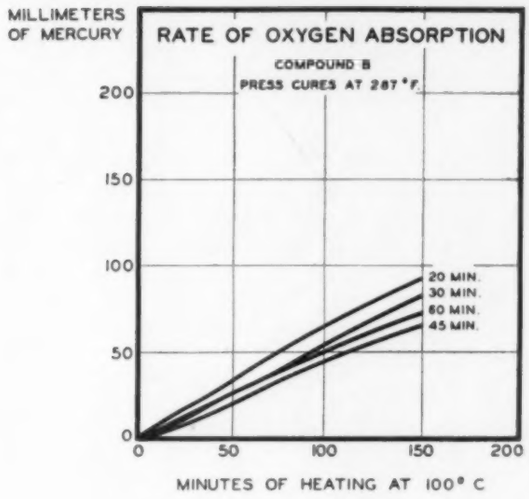
Graph No. 1 shows the rate of oxygen absorption by Compound A cured 20, 30, 45 and 60 minutes at 287° F. Graph No. 2 shows the same for Compound B. Compound B is the same as A plus 1 part of Agerite Resin D. The results definitely show the advantage of an antioxidant in the compound for slowing the rate of oxygen absorption. This observation correlates favorably with tensile strength deterioration data obtained from oxygen bomb aging.

The curves for the various cures of Compounds A



Graph No. 1

and B fall in the same relative positions. The 20 minute cures have the highest rate of absorption. The 45 minute cures have the lowest rate of absorption. The 30 and 60 minute cures fall between the 20 and

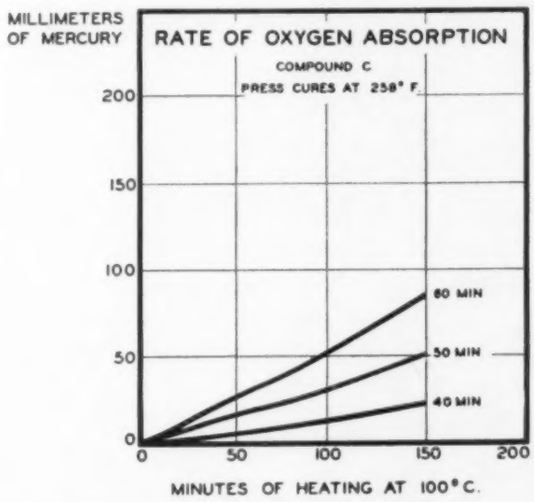


Graph No. 2

45 minute cures with the 60 minute cures lower than the 30 minute cures.

From the standpoint of oxygen absorption only, the 45 minute cure for Compounds A and B is the best. This is past the optimum cure with respect to the tensile strength of the unaged compounds.

Graph No. 3 shows the rate of oxygen absorption by Compound C cured 40, 50 and 60 minutes at 258° F. This compound contains low sulfur with no antioxidant on the standard base. Compound C, however,

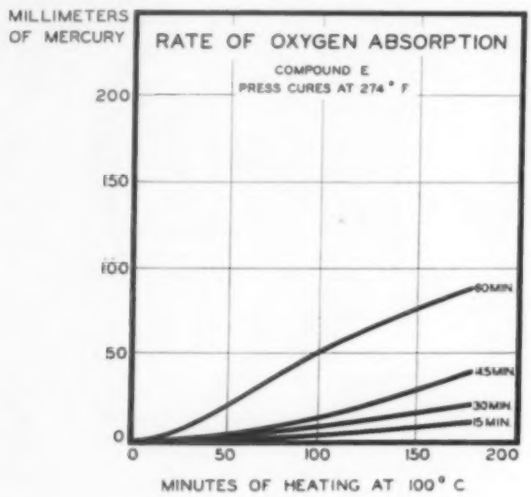


Graph No. 3

is vulcanized at a lower temperature than A and B, *i.e.*, at 258° F. instead of 287° F. This compound has a much lower rate of oxygen absorption than either A or B, especially at the 40 minute cure. Compound C also has a lower rate of tensile strength deterioration in the oxygen bomb than Compounds A and B.

Judging from the rate of oxygen absorption the 40 minute cure is the best. This cure also is the optimum cure with respect to the tensile strength of the unaged compound.

Graph No. 4 shows the rate of absorption by Compound E cured 15, 30, 45 and 60 minutes at 274° F. This compound is the standard base compound with one part of an antioxidant but has no sulfur. It is vulcanized with Tuads and Telloy. This compound has a much lower rate of oxygen absorption than either

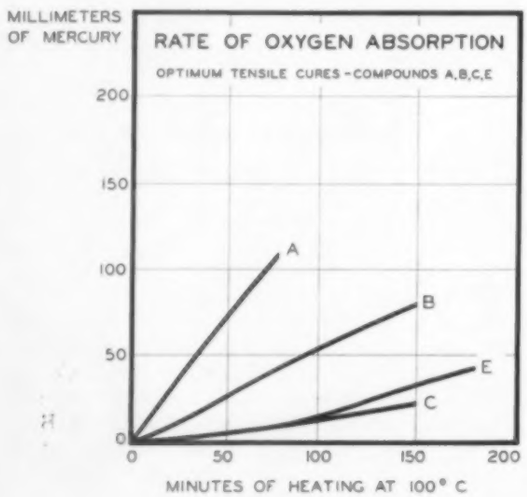


Graph No. 4

A or B. Considering all the cures on Compounds C and E, Compound E has a lower rate of absorption than Compound C. However, in looking at the specific cures used in the oxygen bomb study, *i.e.*, 40 minutes at 258° F. for Compound C and 45 minutes at 274° F. for E, Compound C absorbs oxygen slower than E. The same comparison is seen in the tensile strength deterioration data for the first seven days of aging in the oxygen bomb.

In the case of Compound E the shortest cure has the lowest rate of oxygen absorption with the longer cures having progressively higher rates of absorption.

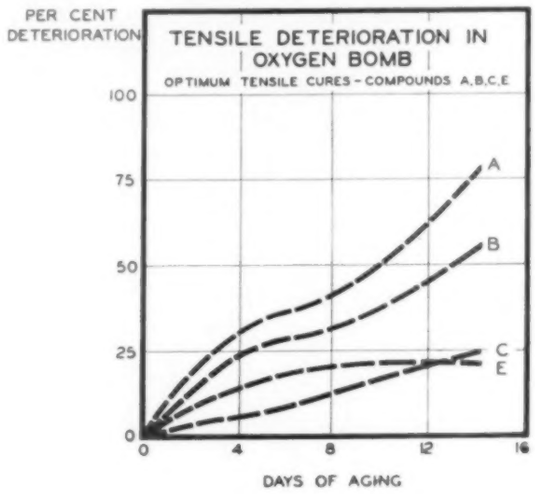
Graph No. 5 shows the rate of oxygen absorption by the optimum tensile cures of the four compounds.



Graph No. 5

The normal sulfur compound with normal acceleration, Compound A, has the highest rate of oxygen absorption. Compound B with normal sulfur and acceleration plus one part of an antioxidant is next highest. The low sulfur compound, C, has the lowest rate of oxygen absorption. The sulfurless compound, E, has a slightly higher rate of oxygen absorption than C.

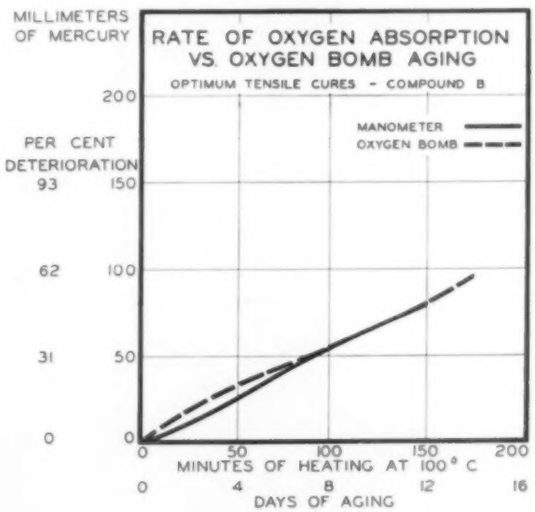
Graph No. 6 shows the rate of tensile strength deterioration at the optimum tensile cures of the four



Graph No. 6

compounds when aged in the oxygen bomb. These curves are plotted somewhat unusually in that 100 per cent deterioration is shown at the top of the vertical axis and 0 per cent deterioration at the bottom. This upside down method causes these curves to take the same general direction as the oxygen absorption curves. The curves for the individual compounds have the same relative positions whether compared by the manometric method or by the oxygen bomb aging method.

Graph No. 7 shows, plotted in the solid line, the rate of oxygen absorption by the optimum tensile cure of

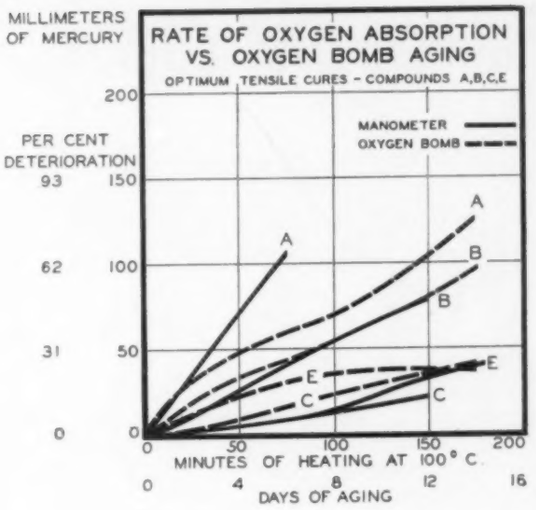


Graph No. 7

Compound B. The broken line shows the rate of tensile strength deterioration of the same compound and cure when the point of 50 per cent deterioration is purposely made to coincide with the height in millimeters of the mercury column after heating for 150 minutes. Thus the two curves practically coincide.

Graph No. 8 shows, plotted in solid lines, the rate of oxygen absorption by the optimum tensile cures of the four compounds. The dotted lines show the rate of tensile strength deterioration of the compounds in the oxygen bomb when the point of 50 per cent deterioration of Compound B is made to coincide with the height in millimeters of the mercury column of the same compound after heating for 150 minutes. Thus when the curves for the rate of deterioration of the compounds in the oxygen bomb are so plotted on the ordinates of the oxygen absorption graph that the two curves for Compound B are made to coincide as nearly as possible the other curves all fall in the same relative positions.

Furthermore, the curves for the rate of oxygen absorption are spread out more fan-wise than are the tensile strength deterioration curves. Thus when results are plotted on comparable ordinates the differences in the aging characteristics of these four compounds show up to a greater degree by the oxygen absorption method than by the oxygen bomb method.



Graph No. 8

Summary

An apparatus can be set up in laboratory glass ware that will confirm the results obtained by Dufraisse in his manometric test for oxygen absorption. It has been shown that different rubber compounds possess different tendencies to absorb oxygen. It has also been shown that the differences in the rate at which rubber compounds absorb oxygen are comparable with those differences found in the rate of tensile strength deterioration of the same compounds aged in the oxygen bomb.

This modified Dufraisse manometric method is convenient, efficient, accurate and above all a speedy method for measuring the relative aging behavior of vulcanized rubber compounds. Within two hours it is possible to have the results by this method whereas it is necessary to wait from four days to two weeks for such information by the oxygen bomb method.

BIBLIOGRAPHY

Dufraisse, Charles, A Manometer for Measuring the Oxidizability of Rubber, *Rub. Chem. & Tech.*, **11**, No. 2, 268-81 (1938).

Dufraisse, Charles, and Etienne, Andre, The Influence of Vulcanization on Oxidizability in Relation to Aging: A Preliminary Study, *Rub. Chem. & Tech.*, **11**, No. 2, 282-309 (1938).

Dufraisse, Charles, and LeBras, J., Applications of the Measurement of Rubber Oxidizability—A Manometric Method: Discussion and Examples, "Proceedings of the Rubber Technology Conference," Paper No. 32, pp. 555-71 (1938).

Dufraisse, Charles, Oxidizability as a Test of the Quality of Rubber, "Proceedings of the Rubber Technology Conference," Paper No. 31, pp. 547-54 (1938).

Dufraisse, Charles, and LeBras, J., The Ultra Rapid Testing of Rubber, *Rub. Chem. & Tech.*, **12**, No. 3, 568-75 (1939).

Modernizing the Bierer-Davis Oxygen Bomb Aging Test, *Vanderbilt News*, **11**, No. 2, 4-10 (1941).

S-125—New Plasticizer for Synthetic Rubber

A NEW plasticizer for synthetic rubber, developed to replace dibutyl phthalate and similar plasticizers, has been introduced under the name of S-125 by the Glyco Products Co., 230 King St., Brooklyn, N. Y. When used in amounts of 5 to 10% the new plasticizer gives a flexibility to cured stock equivalent to that of 20 to 30% dibutyl phthalate, according to Glyco Products, and does not exude from the stock. Furthermore, in these amounts, it has definite lubricating tendencies thus facilitating release from the molds.

S-125 is insoluble in mineral and vegetable oils and accordingly gives added resistance to grease and oil when the synthetic rubber compound is used in the manufacture of such products as hose, gaskets and packings. It has a low freezing point, making it adaptable for low temperature work, and has a definite wetting tendency for pigments, thus enabling them to be milled into the stock, giving easier and quicker grinding as well as uniform dispersion throughout the stock. It is recommended that S-125 be added to the stock in small portions, allowing each portion to be digested by the stock before the next portion is added, this method eliminating the possibility of slip on the mill.

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Rubber Dispersions

By RAYMOND E. NELSON

Naugatuck Chemical Division, United States Rubber Company and Dispersions Process, Inc. New York, N. Y.

THE following discussion of rubber dispersions is confined to those of natural rubber. They are commonly called colloids but are not truly so, being of larger particle size and higher viscosity than true colloids. They do exhibit colloidal properties because the particle size is very small and they are coated with peptizing agents which produce the colloidal reactions. Thus they may properly be termed colloidal suspensions.

The behavior of such suspensions in technical processes is a function of the surface film on the particle, whereas the ultimate usefulness of any product made from them is mainly characteristic of the particle itself, but may be modified by residual protective material in the dried film. Hence, it seems worthwhile to consider the particle and the protective films separately in order to visualize the grade of stock that should be chosen to do a given job and the type of colloid that will function best in the process.

Normal latex as withdrawn from the tree may vary in solids content up to 50% and different stocks will vary slightly in non-rubber constituents depending upon the locale of origin. The normal latex of commerce is standardized to 38-40% total solids, of which about 12% are non-rubber solids which have been added to the suspension by careful Nature to buffer and protect it. These consist of proteins, water soluble organic and inorganic substances and further materials which are extractable in acetone.

The usual preservatives added to the latex on the plantations are for the purpose of arresting bacterial and enzymic action and preventing coagulation. The ammonia which is almost universally used enters into chemical union with some of the non-rubber solids, fixing them as ammonia derivatives, maintains the particle charge, and counteracts the acid forming bacteria and enzymes which may still function.

Some Uses of Normal Latex

Because of its high mechanical and chemical stability, normal latex can be used under severe conditions, such as extreme high and low temperatures. Also because of the high non-rubber solids, it would normally be used where these are not objectionable, as in can sealing, saturations, adhesive applications, sizings, or where other added materials cover any effect of the latex serum solids.

Concentrated latex is made either by centrifugal separation or by creaming. Concentration is usually started with latex of low solids content with the result that in the concentrate there are about 5 to 6% of non-rubber solids, the balance remaining in the serum which is discarded. In centrifuging latex, this removal of excess stabilizers yields a concentrate which is less stable than normal latex and, therefore, sets or coagulates rapidly. The viscosity is low as is the yield point. Such a suspension would be used where rapid set and tack are of importance as in some adhesive applications; or in dipping work on thin gauge articles where rapid draining off the form is desired, leaving a thin uniform film.

Changes Caused by Concentration

Concentration by creaming involves the addition of a creaming agent which adsorbs on the latex particle and slows down its Brownian movement sufficiently to cause the rubber to cream and separate from the main serum in a reasonable period of time. The same percentage of non-rubber solids is found in creamed concentrate but as some creaming agent is now adsorbed a more mechanically stable concentrate is obtained. The viscosity is also slightly increased as is the yield point. The surface tension is lower. Such a concentrate might be specified for all spraying or coating operations and probably for most all concentrated latex operations. It must be remembered that the stated differences between centrifuged and creamed concentrates apply to the latex alone and that any compounding with curing pastes, fillers, thickeners and other ingredients may more than offset these minor differences. Clever compounders use the two types almost interchangeably.

Another type of concentrated latex available on the market is made by evaporation of water from normal latex. Stabilizers are added to the normal latex to enable it to withstand this process and these solids are added to the original non-rubber solids of the normal latex. This factor, as well as the effect of heat on the latex particles, produces a concentrate differing from the cold concentrated latexes under discussion.

The amount of proteinaceous material which is actually adsorbed on the latex particle is thought to be only .1% N or .6% protein. All other non-rubber solids in the latex are considered unnecessary for sustaining dispersion. The actual composition of this protein will vary with the age of the latex, its source and degree of preservation. This unknown factor may well be responsible for the sometimes unexplainable discrepancies in the performance and stability of some latex compounds. Latexes approaching the minimal amount of protective colloid are produced by repeated centrifuging or creaming. Films produced from such latexes are noteworthy for their high degree of water resistance. Wire insulation of high dielectric strength is made from such latex. Table I shows the principal

NOTE: This article is based on a talk given by the author before the Buffalo Group, Rubber Division, A.C.S., on October 3, 1941.

TABLE I—LATEX CHARACTERISTICS

	Normal	Centrifuged	Creamed
Total Solids	37.5—40.5	61 —64	60 —65
%NH_3	.9— 1.0	.5— .65	.6— .8
pH	10.1—10.5	10.1—10.5	10.1—10.5
Viscosity—cp	4.0— 5.5	30 —50	30 —60
Yield-point cg/cm^2	1.0 max.	3.0 max.	3.0 max.
Surface Tension—dynes /cm	33.5 min.	33.5 min.	31.0 min.
Mechanical Stability—minutes	6.0 min.	4.0 min.	4.0 min.
KOH Number	1.2— 2.0	.4— .8	.4— .9

Note: Characteristics determined by Tentative Testing Procedures recommended by the Crude Rubber Committee, Division of Rubber Chemistry, A.C.S.

characteristics of the three types of latex due to the protective colloid.

Compounding of latex takes the form of adding the desired ingredients either directly or as stabilized suspensions compatible with the latex suspension. Some chemicals may by solubility in the serum, by combination with serum solids, or by chance impact find their way to the rubber and thus react while the rubber is still dispersed. However, most ingredients are inhabitants of the aqueous phase and do not come into contact with the rubber until dried in the film. Their reactions on the rubber hydrocarbon may thus be delayed, incomplete, or appear only as a mixture of adjacent rubber and material particles.

There is a theory that the original latex particle never loses its identity in a finished rubber article. Certainly this may be true in the case of latex rubber articles, and perhaps even in milled rubber many of the particles escape complete deformation. This at least is part of the theory underlying the process of redispersing solid rubber to make artificial latexes which are known as dispersions.

The process essentially consists in introducing the rubber into a mixer followed by the addition of the dispersing agent. Then water is gradually added, a little at a time, and is worked throughout the rubbber mass. During this time the dispersing agent operates as a dispersing agent for water in rubber matrix, working the water into the mass between the cemented particles. The operation continues forming minute droplets of water in the rubber mass until saturation is reached, at which time the water droplets coalesce, reversing the phase, and further dilution produces the stable dispersion of rubber in water.

History of Early Dispersions

The first dispersions made in 1922 were crude and uncertain. About 13 to 15 parts of such protective colloids as glue-saponin, casein, rosin soap and bentonite were used. Further technical development produced far better dispersions with fixed rosin soaps using 8 to 10 parts for 100 of rubber solids. These are now termed high soap dispersions. Further reduction to 2 to 4 parts, using fixed oleate soap, was accomplished with vastly improved uniformity, stability and particle fineness. The most recent development is the use of volatile bases as in ammonia soaps which disappear from the film, leaving essentially the base stock. Such dispersions are fast setting, on the order of centrifuged latex, are water resistant and are useful in many applications where latex was formerly used, and in some of these are superior.

Dispersing agents of known formulation and amount are used for dispersing the rubber. No excess is figured for buffering in the standard dispersion. The definite working properties thus incorporated into the dispersion then allows the user to accurately determine his process. Soap dispersions have infinite mechanical stability. On the other hand, the chemical stability is low, excessive dilution, high or low temperature or chemicals which insolubilize soap all tend to induce coagulation. Therefore, the dispersion must be compensated with the specific stabilizer effective in counteracting the critical influence in each process. This is done either by the purchaser or by the manufacturer in those compounds designed for a specific application.

Fixed soap remains in the film, similar to latex colloid, and makes such films somewhat water absorbent, except in acid coagulation processes, while volatile soap leaves only a residue of acid which is adsorbed by the film.

Advantages of Present Dispersions

Dispersions possess the advantage that all materials designed to react on the rubber, such as antioxidants, rubber soluble accelerators, plasticizers or tack agents, can be added to the rubber on the mill assuring complete and intimate contact. Other materials, such as fillers, sulfur, zinc and thickeners, can be added during dispersion, thus removing the necessity of preparing separate pastes and the addition of non-essential or undesirable ingredients to the film, such as casein, wetting agents, etc., used to paste chemicals.

Dispersions may be prepared from either reclaimed, crude or synthetic rubbers. Suitable reclaim for dispersion must be highly refined and of uniform plasticity to produce smooth, finely dispersed suspensions. Crude rubber is more difficult to redisperse than reclaim but crude rubber dispersions are being commercially produced which are of the same order of particle fineness as latex. Table II shows the range of properties to be found in some typical dispersions.

Turning now to a consideration of the rubber quality, we know that latex rubber is the finest available, producing cured films which show tensiles up to 6,000 pounds per square inch and with high modulus.

TABLE II—DISPERSIONS CHARACTERISTICS

	Crude	Reclaim
Type of Rubber	Pale Crepe Smoked Sheet	Tube—Light Colored Red Black Whole Tire
Total Solids	55.0	50 —60
pH	9.5	10.5—11.0
Viscosity—cp	100	100 av.
Yield-point—cg/cm^2	5.0	5.0
Surface Tension—dynes/cm	35.0	35.0
Mechanical Stability—minutes	+30.0	+30.0

The films are nervy. It is also true that for many commercial applications these values are in excess of what is needed or desired. For example, a high modulus latex glove may hinder blood circulation in the fingers of the hand. The high modulus also accounts for the easy snagging and poor abrasive resistance of latex films. Many commercial latex workers knowingly or unknowingly only partially cure the latex film, as in toy balloons for example, this partial curing eliminating some of the objectionable features.

Crude rubber dispersion films show lower modulus than latex films due to the working the rubber receives in the pre-milling and in the dispersion mixer. Tensiles on cured films are reported up to 4,000 pounds per square inch. These facts offer interesting possibilities. By predetermined degree of crude breakdown films can be produced which overcome the latex film objections for such products as soft sheeting, laminations which handle and drape easily, or balloons which are easy to blow up, and surgeons' gloves. It also suggests the possibility of attaining any predetermined physical properties of the film over the entire range possible with rubber suspensions.

Reclaimed rubber dispersions yield films which are not sufficiently strong to be used by themselves in a thin product such as gloves. They are soft films, of low modulus, with tensiles up to 1,500 pounds per square inch. Reclaim dispersions would be used in sizing work to obtain the flexibilizing and adhesive features of the rubber, in saturation work, in adhesive applications where a soft draping lamination is desired and the surface area is sufficient to give a high overall strength, as shoe doubling, or for non-skid coatings on carpets. Reclaim dispersions are entirely adequate to meet the most rigorous requirements in some applications. A certain type of rug uses dispersed reclaim in place of weaving to bind the pile. Their high resistance to aging indicates their use in fields where the initial better qualities of latex would soon be impaired. Their more stable lower price picture invites consideration at all times.

We have been forced, in this discussion, to be general and avoid specific compounding and production application because the uses of water dispersions of rubber are so widespread. Indeed, it is almost impossible in our daily life to avoid some contact with a dispersed rubber product. You walk down the street in shoes that may be latex cemented, that well dressed lady you pass is wearing shoes of gabardine cemented to "Lastex" fabric with latex cement, and, while you are looking in that direction, her hose may be latex-treated as well. You step into a store and buy a notebook with a saturated paper cover or a child's latex toy. You step into your car on a carpet that is a rubber dispersion job and fall back on a foam cushion or latex-treated curled fibre. On the golf course you pull down the visor of your cap which has latex in it and hit a latex thread golf ball. At the club you sit in a chair with rubber backed upholstery and look up a number in the phone book which is latex bound. This list can go on indefinitely.

The significant thing seems to be that industries other than the rubber industry have made the most progressive use of rubber suspensions.

Bishoprocess for the Reclaiming of Rubber

WITH the growing production of earth-moving tires and synthetic rubber products of miscellaneous use it soon became apparent that if the scrap from such products which found its way into scrap rubber stock was to be properly devulcanized much higher temperatures than generally used in present reclaiming processes would be necessary. Accordingly, reclaim engineers have been working on this problem and various improvements have been incorporated in present methods. One system developed is called the "Bishoprocess," and according to its inventor, Charles E. Bishop, 1401 South Hill Street, Los Angeles, Calif., it incorporates several advantages over present day methods.

With the objective of developing a reclaiming method which would work equally well with scrap rubber containing either natural or synthetic rubber, or both, Mr. Bishop first designed an entirely new type of digester. This was necessary in view of the fact that the cost of building the present type of jacketed digester with the jacket and inner walls heavy and strong enough to stand high collapsing and explosive pressures would be prohibitive, besides which such construction would call for a high-pressure steam generating plant.

Furthermore, it was discovered that the proper and most thorough devulcanizing of scrap containing natural and synthetic rubber can be accomplished only when suspended in a liquid vehicle which will not generate super-heated steam at the high temperature required but will develop a vapor as an inert gas. Accordingly, the new process makes use of a solution containing a chemical having an affinity for sulfur. The equipment eventually developed is known as the Bishoprocess Vapor/Phase Digester, with temperatures and pressures independently controlled.

According to Mr. Bishop the new digester incorporates the following advantages: Its capacity is equivalent to four of the conventional "vertical" type digesters currently in use; heat losses are reduced to a minimum, since the heating units are conserved by heating water later used in new charges and washing; no tower structure is necessary for installation, single story layout being sufficient; temperatures from 100° to 600° F. are available; no explosion hazard is present; the machine is self-cleaning; and the need for a high-pressure steam generating plant is eliminated.

Using the new system, complete plants with units designed for either 12 or 24-ton capacity for 24-hour operation can be installed individually, parallel in position, and in any multiple units desired. Layout can be made completely on the ground floor if desired and provision is made for a roof monitor above each unit so that daylight conditions and economical ventilation are secured. Provision is also made for straight-line production so that no trucking of stock is required from the time the scrap enters the plant until it is delivered into finished stock stores. This modern method of straight-line production provides for economical operation.

Compression Molding of Plastics

No. 3 of a Series of Four Articles on Plastics

By J. DELMONTE

Technical Director,
Plastics Industries Technical Institute,
Los Angeles, California

THE large majority of plastic materials are made available to industry as molded parts. Employing pressures of several thousand pounds per square inch and temperatures up to 350°F., molders produce a wide variety of articles from the many types of materials. Preference is for the hydraulic type of molding press, which can follow up with its stroke as material flows throughout the mold and maintain constant pressure. In this article the specific problems of and equipment for compression molding will be discussed, while in the next paper injection molding will be treated in a similar manner.

Compression molding is conducted by placing a charge of molding material within the mold, which has been previously heated, and applying pressure on the material by closing the mold. After the material flows to the extremities of the mold cavity, the article is ejected while hot if of a thermosetting variety. If of thermoplastic nature, it is chilled before ejection.

Thermosetting molding materials are only partly cured before they are placed in the mold, curing to a hard infusible body as they flow during molding. The usual thermosetting composition contains synthetic resin, filler, dyes, catalysts, and lubricants to insure proper release from the molding surfaces. The great majority of compression molding operations is performed upon this class of materials as the time required for a compression molding cycle is very much shorter than required for a thermoplastic material under identical conditions. Phenolic and urea compositions are the thermosetting types which find widest adaptation.

All types of thermoplastic materials may be compression molded, providing proper temperature and pressure are applied. Like thermosetting materials they are provided with dyes if required, and mold lubricants, though, in lieu of fillers, plasticizers may be added to control flow properties and physical properties of the molded parts. Whereas thermosetting materials are capable of flow due to their mobile character when polymerizing under pressure, thermoplastics are already polymerized and simply soften under heat and applied pressure. This same characteristic necessitates chilling the material before it can be removed from the mold. The additional time required for chilling prolongs compression molding cycles of thermoplastics to such an extent that they are hard pressed to compete with thermosetting materials, though in the field of injection molding they dominate without much dispute. Synthetic resin thermoplastic molding compositions cost two to four times that of compression molding materials.

Representative of compression molded articles are the large "cardineer" filing card wheel, molded of a shredded fabric-filled phenolic composition, shown in Figure 1 (overall diameter of 21 inches), and the urea formaldehyde, alpha cellulose-filled molded housing for a thermostat control device, shown in Figure 2.

Preparation of Material for Compression Molding

Preforming and preheating of materials are widely practiced in compression molding of thermosetting plastic materials. Preforms not only reduce the bulk factor of the molding charge but also simplify measurement of molding charge for the press operator. This becomes increasingly important when multiple cavity molds are involved. For example, to speed up the molding cycle a loading tray containing preforms can in a few seconds fill a 24 or 30 cavity mold. Preforms may either be shaped to agree with the contour of the mold or else prepared in pill or tablet shape.

Preforming machines such as that shown in Figure 3 are commonly seen in plastic molding plants. They are of two varieties: a single punch machine producing up to 120 preforms per minute or else a rotary type of machine producing several hundred per minute if necessary. Most thermosetting materials will preform satisfactorily, with the exception of a few high bulk factor types which will not flow down the hopper of the preforming machine readily and hence must be

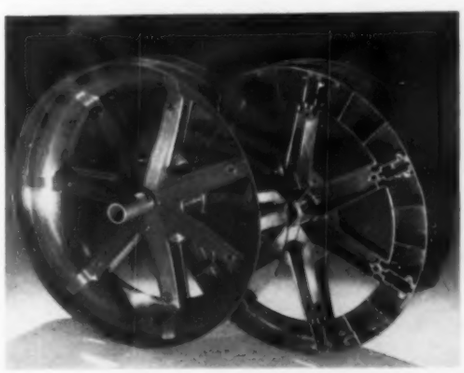

FIG. 1—Wheels molded of a shredded fabric-filled phenolic composition.

FIG. 2 — Housing for a thermostat control device molded of an alpha cellulose-filled urea formaldehyde.

tabletted by hand. This, however, is a slow process. Notwithstanding, powders are frequently used either by themselves or in conjunction with preforms.

Increasing importance has been attached recently to the preheating of molding materials. It is a well known fact that the time for molding can be reduced and the quality of the molded part improved. Phenolics are preheated at temperatures around 200°F., whereas ureas are preheated at temperatures around 180°F. or lower. Press closing time can be substantially reduced by such a pre-treatment. Tray or rotary cup preheaters are common equipment used in the molding room.

In connection with the handling of plastic materials prior to molding it is well to mention the importance of avoiding promiscuous exposure to the atmosphere. It will not only incur the possibility of bubbles, blisters, or gas pockets because of entrapment of moisture, but in the case of the urea, the moisture will activate some of the polymerization catalysts which have been dry blended into the composition and cause a decrease in available flow properties. Molding materials are furnished to the custom molder in moisture-proof drums in powdered or granular form.

Operations In the Molding Room

Compression molding of plastics follows very conventional lines. For thermosetting materials, the stages of the cycle include the following steps:

1. Add molding charge, and inserts, if any.
2. Close the mold under low pressure.
3. Apply full molding pressure.
4. Breath mold to permit escape of volatile material.
5. Cure the article.
6. Open mold and eject pieces.
7. Clean mold with air blast.

To the above should be added cooling for thermoplastic materials. The longest phase of the compression molding cycle is the cure time, because it is during this period that the plastic develops its best physical, electrical, and chemical properties. Cure time depends upon molding temperature, the rate of resinification of the thermosetting resin, and wall thickness. It may vary anywhere from 30 seconds to 10 minutes for very heavy sections. The relation of physical properties to cure time may be readily established for different plastic materials under different conditions of molding. In Figure 4 a typical curve establishes shear strength as a function of cure time by a method worked out at the Institute.

Insofar as the flow of thermosetting materials is concerned there are two observable factors which emphasize distinctions between individual types, namely: extent or distance of flow and time duration of flow. Thermosetting materials may set-up very rapidly, making it difficult to complete moldings of long draws. Slower curing types are ordinarily selected for very large moldings.

After the articles are removed from the mold they are sent to the finishing department where excess flash is filed off and parts are inspected. They come from the molds with the lustre or polish that is required.

In the molding room, recent developments have incorporated high-low pressure systems for the hydraulic equipment. Operating around 500 p.s.i., the presses are closed, while pressures of 2,000 to 3,000 p.s.i. are delivered to the ram for the actual molding. While the majority of presses installed are of the system type, dependent upon a central boiler and 125-150 pounds of steam for their heat, self-contained units are in greater demand. These units are designed with their own heat and pressure developing means and will operate independently of the main plant.

In Figure 5 is shown a typical hydraulic, up-stroke molding press. Instead of the heavy steam plates ordinarily found on rubber presses for curing sheet stocks, the platens are generally equipped with T-slots for the attachment of molds. Many of the multiple cavity plastic molds are heated directly by circulating steam close to the molding surfaces. Where hand molding is practiced, steam plates often serve very satisfactorily, as shown in Figure 6, which illustrates a hand-operated 30-ton laboratory compression molding press.

The tonnage of presses usually found in plastic molding plants range from 10 tons to 500 tons. They

FIG. 3—Type of preforming machine generally found in plastic molding plants.

are of the straight up and down variety in most cases, though some molders are equipped with presses with side acting rams, or tiltable and rotatable heads. Presses of smaller tonnage can be operated by hand pump, though motor-driven pumps are employed for self-contained units of larger tonnage. For system presses, pressure is derived from pump accumulator systems.

More recent developments in the plastic molding field include fully automatic molding machines which feed and eject pieces automatically, as well as perform the usual stages of compression molding. In Figure 7 is shown a close-up view of a press of this type. Molded pieces are expelled by air blast from a series of copper tubes bent up along the side of the mold. Material is fed automatically from a hopper above through a metering device. These presses will operate without benefit of an operator after they have been adjusted, requiring only periodic refilling of the hoppers.

In the case of the fully automatic presses, molding materials must be used which will readily feed down the hopper to the mold. In addition to fully automatic compression molding presses, there are semi-automatic types which will accurately control to a split second all phases of the molding cycle, leaving the adding of charges and removal of pieces to the operator.

Representative compression molding temperature ranges for various plastic materials are contained in the following table:

Molding Material	*Temperature Range*
Urea formaldehyde, alpha cellulose filler.....	300-320°F.
Phenol formaldehyde, wood flour filler	290-360°F.
Cellulose Acetate, Grade MS	285-305°F.
Polymethyl methacrylate, Grade M	320-350°F.
Polystyrene	240-350°F.
Polyvinyl chloride-acetate	250-300°F.

The above temperature ranges are typical for plastic materials derived from synthetic resin and cellulose derivative sources. Where special materials or natural resins are involved the specifications may change. Thus, for example, certain compositions with asphalt base may find temperatures of 200°F. adequate for producing battery cases.

Once molded, scrap material of thermosetting plastics lacks value except as a filler. Thermoplastic scrap of course may be re-used an indefinite number of times.

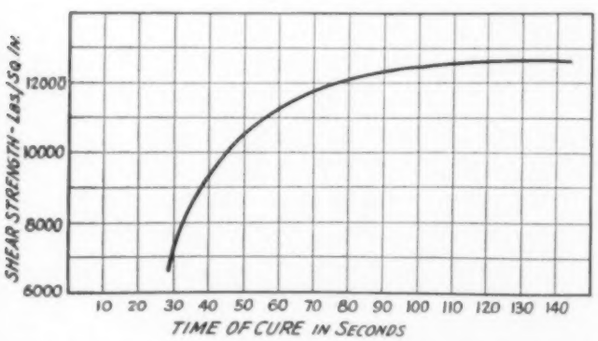

FIG. 4—Typical curve of a molded urea plastic at 310° F. which establishes shear strength as a function of cure time by a method worked out at the Plastics Institute.

FIG. 5 — Typical up-stroke molding press, with T-slot platens visible.

Finishing Operations on Compression Molded Plastics

Particular care is exercised in handling and finishing of compression molded plastics. Oftentimes there are further operations after pressing designed to augment the attractiveness of the article. While molding compositions in various colors are available, there are decorative effects applied externally, such as metal inlays or metal plating, or simply wiping-in some contrasting enamel. In many cases machining operations such as drilling side or oblique holes are conducted upon the molded piece rather than to attempt to mold them in a more costly mold design.

Flash of course must be trimmed off of molded pieces, though in well made plastic molds this is held to a minimum, requiring very little effort to accomplish. Transfer molds, in particular, have very little finishing required of their molded parts. They are also effective in molding about inserts, such as the insulator unit shown in Figure 8, which combines metal and fiber parts. For large numbers of small parts, definning barrels will rapidly remove flash from thermosetting plastics.

Compression Mold Design

The success of compression molding of plastic materials largely depends upon how well the mold is designed to perform the necessary operations. In many cases they are expected to produce hundreds of thousands of pieces with little change. For high production runs steel molds are preferred, though castable metal alloys have been used when the operating requirements were not too severe. The molds are hardened to withstand abrasive action of some of the compounds. Where the design of the mold is fairly simple and

well rounded, low carbon steels may be selected for ease of machining, and a hardened case put on after the cavity is completed. However, for complicated mold design features, a tool steel is preferred, so that on heat treatment the face as well as the core will be fully hardened.

Considerable time is spent in the preparation of the mold and usually a high polish appears on the surface to facilitate ejection and add to appearance of the molded plastic article. The molds are either machined or, for multiple cavity designs, hobbing methods are employed. By sinking a master hob into suitably prepared blocks of steel, a large number of cavities may be prepared which are exact counterparts of the original hob. These of course are adapted to steel chases together with other component parts of the mold.

Molds for compression molding of plastics fall into several classifications, depending upon the type of work being done as well as the method of production. Insofar as the material is concerned, there must of course be adequate loading space to contain the bulk factor of the molding material. In some cases the bulk factor is as high as ten, requiring a deep mold to hold the entire molding charge. Concerning distinctions between molds for thermosetting and thermoplastic molding materials, the most noteworthy distinction in the respective compression mold designs are the provisions for cooling incorporated into the molds for thermoplastics. Of course, in either case the ports used for circulating live steam may also at the proper stage be employed for circulating cooling water to the mold.

Molds for plastics are classified as either flash or positive type. In the flash type of mold the downward motion of the force is arrested by some positive stop, as for example a land area at the flash line region or else some type of landing pad about the guide pins. Positive molds insure full and positive entrapment of molding material, the full brunt of the molding pressure being applied directly upon the molding charge. The flash and positive types of molds are of course subdivided into several classifications in turn, the most notable of which are the semi-positive molds, which are used more extensively than any other in the compression molding of plastics.

FIG. 6—Thirty-ton laboratory compression molding press, suitable for hand molding.

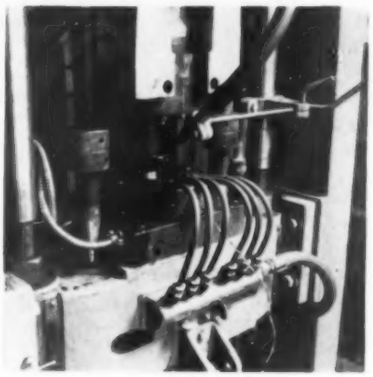

FIG. 7—Close-up view of one of the newer fully automatic molding machines.

Classified by Production Methods

Molds are often classified in accordance with the method of production, as for example hand molds, which are not permanently attached to the platen of the press, or semi-automatic molds, which are attached to the press and are equipped with necessary ejector devices for removing articles and simplifying the work of the operator. In many cases the ejector mechanisms are operated by auxiliary cylinders furnished with the molding press specifically for that purpose.

In the next and concluding paper on plastic materials, features of injection molding operations, machines, and mold design will be reviewed.

FIG. 8—A transfer mold was used in making this metal and fiber insulator unit.

Editorials . . . . . .

What About the Stockpile?

THERE seems to be little doubt at this writing that the government will achieve its present stockpile objective early in the coming year. By the end of the present year it will have the desired 518,000 tons of "emergency" rubber on hand and afloat. The rapid accumulation of the stockpile is due, of course, to the curtailment program initiated under General Preference Order No. M-15. The obvious question, then, is now what? Will the Rubber Reserve Company seek to expand its stocks further, and, if so, will the United States Maritime Commission furnish the requisite shipping space?

In Washington circles, it is rumored that the Rubber Reserve Company leans toward increasing the stockpile of emergency rubber somewhere near a 1,000,000 ton figure. Many rubber authorities doubt the wisdom of accumulating and holding such a large amount of rubber because of the deterioration factor. To this argument, reserve officials are said to have stated that with modern means of preservation it would be no great task to preserve rubber indefinitely, or at least for the length of the emergency. This is a question which only time could answer.

The final decision of the Rubber Reserve Company with respect to the ultimate amount of rubber to be stored for reserve purposes will probably not be announced for the next few weeks. At this writing the Far Eastern situation is in a critical state, with virtual ultimatums being delivered to the United States by Japan. If no diplomatic answer is found to the present strained relationship between the United States and Japan in the very near future, then it is quite probable that the Rubber Reserve Company will go "all-out" on the stockpile, and few dissenters to this action will be found. The only possible real danger to continued heavy shipments of rubber from the East to this country lies in the final action taken by Japan.

As for the rubber manufacturing industry, it of course prefers that present restrictions be lifted somewhat so that it can secure a larger amount of rubber for processing. Inclusive of all defense demands now being placed upon it, the industry could meet all requirements—military and civilian—if it could obtain between 60,000 and 65,000 tons of crude rubber monthly. Allocations under the present curtailment program call for a total of only 45,000 tons in December.

New Preference Order Coming

GENERAL Preference Order M-15, under which the distribution and preservation of crude rubber now rests, expires at the end of the current year. The objective of the order was to curtail consumption of crude rubber in the United States by approximately 20% by the end of 1941. This objective will definitely be reached. Since the world picture has changed but little since the inauguration of the preservation order, there is little doubt that a new order will be issued at the turn of the year to supplement the present one.

Insofar as control of distribution is concerned, the new order will probably closely approximate the present one. But, as intimated by government officials recently, the new order will go further. It will not only restrict consumption of crude rubber but it will set up means of product control and call for a definite simplification program. This is part of the widening circle which follows practically any measure of control instituted by the government. Forewarned should be forearmed.

CURRENT NEWS OF THE MONTH

BRIGHT FUTURE FOR SYNTHETIC PREDICTED BY GOODRICH HEAD

Although the nation has developed synthetic rubber primarily as a replacement for natural rubber in an emergency, the future of the new and fast-growing synthetic rubber industry does not necessarily depend upon replacement of natural rubber, John L. Collyer, president of the B. F. Goodrich Co., told the Cornell Society of Engineers at a meeting held in New York City on October 31.

"This statement is based on the fact that many scientists are forecasting the future in terms of an 'age of petroleum.' They make this prophecy not merely because petroleum will serve as fuel and lubrication for increasing numbers of internal combustion engines, but because crude oil is the principal source of the hydrocarbon molecule. This molecule, used in many different forms, is truly the common denominator of many of the newest developments in industrial science," Collyer said.

"Since petroleum is one of natural rubber's greatest enemies, causing it to swell and disintegrate, the development of synthetic rubber which is virtually unaffected by oils and hydrocarbon solvents means that the scope of the rubber industry's participation in this 'age of petroleum' will constantly increase," he declared.

Not Competitive to Crude Rubber

The superior characteristics of synthetic rubber for many types of service leave no question, he said, that synthetic rubber can score a notable success throughout industry without disturbing the time-honored position of natural rubber in hundreds of fields and applications where it is entirely adequate as a material.

"Practically all the synthetic rubber produced in this country today is being used for special purposes, such as in the B. F. Goodrich airplane De-Icers for military and commercial use, bullet-sealing gasoline tanks for combat aircraft, fuel hose for use in handling oil, gas masks and a score of items now flowing out of our factories to American and British armed forces," Collyer stated.

In civilian applications, synthetic rubber has already distinguished itself by making possible valuable technical advances and time and labor economies in the printing industry where synthetic rubber molded printing plates are now in wide use. It is also used in conductive compounds which avoid the hazard of uncontrolled static electricity discharges in industrial tires and other rubber products used in many industries.

Sponge Rubber for Arrows

An interesting use of sponge rubber in connection with arrows is made by the government in connection with live stock in its national forests. In the Gunnison National Forest marksmen use arrows tipped with sponge rubber balls, which are dipped in vari-colored paints, to mark or brand deer in an attempt to discover how much they move from one feeding ground to another. The "wounded" deer hardly bat an eyelid when hit because the sponge rubber deadens or dulls the blow.

FIRESTONE HEADS ADVANCE WITH THOMAS NEW CHAIRMAN

The election of John W. Thomas, president, to the chairmanship of the board, and the elevation of Harvey S. Firestone, Jr., vice-president, to the presidency, was announced by the Firestone Tire & Rubber Co. on November 8. The office of chairman has been vacant since the death of Harvey S. Firestone, Sr., founder of the company, in February, 1938. Mr. Thomas has been associated with the company since 1908 and has been president since 1932. Harvey S. Firestone, Jr., has been vice-president since 1929.

Three other advancements in the company were announced at the same time: Lee R. Jackson, vice-president in charge of sales, was named executive vice-president; John J. Shea, treasurer, becomes vice-president and treasurer; and H. D. Tompkins, assistant to Mr. Jackson, is now vice-president in charge of sales. All three have been with Firestone for a number of years.

In announcing the action of the board of directors, Mr. Thomas stated that the changes were being made to attain greater organization strength in meeting today's unusual problems of national defense and the company's rapidly expanding world-wide business.

"RUBBER COMPONENT" DEFINITION CHANGED BY REVENUE OFFICIALS

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Definition of "Rubber Component"

In other words, as Mr. D. S. Bliss, Deputy Commissioner of Internal Revenue, pointed out in a recent letter to RUBBER AGE, for an article to be subject to tax the weight of the rubber compound or mixture must exceed the weight of each other single component, such as cotton, wool, silk, wood, glass, iron, steel, brass, copper, etc., but items described as fillers, pigments, chemicals, accelerators and reclaimed load will be regarded as constituents of the rubber compound. While the term "rubber component" also includes reclaimed rubber and hard rubber dust, it does not include so-called synthetic rubber.

This new definition brings many more rubber articles under the taxable lists. Special regulations with respect to rubber articles are now being promulgated and will be made available on completion.

NO RADICAL CHANGES SEEN IN 1942 ALLOCATION PROGRAM

Although no radical alteration is likely to be made in the quota allocation system for the first few months of 1942, it seems quite likely that a new order of government control will be issued to replace the current General Preference Order M-15, which expires at the end of the present year. This is the belief in official Washington circles following a meeting held on October 29 between officials of the Rubber and Rubber Products Branch of the Office of Production Management and the recently appointed Rubber Industry Advisory Committee.

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It is generally understood in official circles that the government's stockpile objective of 518,00 tons by the end of 1941 will be reached, despite recent losses of government-owned rubber by ship sinkings and the fire at the Fall River plant of the Firestone Tire & Rubber Co. Although all of this rubber will not be on hand by the end of the year it will definitely be afloat. If this objective is reached, as it is expected to, then an easing of stockpile needs for 1942 is expected, although no official comment has yet been made. One reason advanced for the government's silence on this point is attributed to the fact that the armed services have not yet stated their specific requirements for rubber for the coming year.

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Coming Events

Dec. 1-6. 18th Exposition of Chemical Industries, Grand Central Palace, New York City.

Dec. 2. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Dec. 4. A.S.M.E. Subdivision on Rubber and Plastics, Hotel Astor, New York City.

Dec. 12. New York Rubber Group, Xmas Party, Building Trades Club, N.Y.C.

Dec. 12. Boston Rubber Group, University Club, Boston, Mass.

Dec. 19. Chicago Rubber Group, Xmas Party, Chicago, Ill.

Feb. 5. Chicago Rubber Group, Congress Hotel, Chicago, Ill.

Apr. 20-24. 103rd Meeting, A.C.S., Memphis, Tenn.

Sept. 7-11. 104th Meeting, A.C.S., Buffalo, N. Y. Rubber Division Headquarters: Hotel Lafayette.

CHLORINATED RUBBER PLACED UNDER RIGID PRIORITY CONTROL

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The order states that "control of the supply and direction of the distribution of chlorinated rubber is hereby taken by the Director of Priorities and all future transactions of any kind in chlorinated rubber are regulated and covered by the provisions and definitions contained in Priorities Division Regulation No. 1, issued by the Director of Priorities on August 27, 1941, except as otherwise specifically provided herein."

Producers of chlorinated rubber are directed to make deliveries only as ordered by the Director of Priorities, and the term "producer," defined in the order, includes all who have the rubber processed for them under toll agreement, or who have purchased it for resale, in addition to those engaged in its primary production.

Uses of chlorinated rubber are in alkali and acid-resisting paints, electric insulation, flame and mildew-proofing of fabrics for tents and truck covers, glass wool binders, gaskets, adhesives, coated paper for food packaging, black metal coating for replacement of tin plate, and other miscellaneous purposes.

All stocks of chlorinated solvents were placed under rigid priority control by Director Nelson on October 14th. This action covers carbon tetrachloride, trichlorethylene, perchlorethylene, and ethylene dichloride. It was taken primarily to forestall a serious threat to the nation's food supply, but will of course have a direct bearing on industrial supplies.

Goodyear Lecturer Nominations

November 15th was the deadline set for nominations for the Charles Goodyear Lecturer. Nominations, which should have been sent to Dr. H. I. Cramer, Secretary, Rubber Division, A.C.S., c/o Sharples Chemicals, Inc., Philadelphia, Penna., had to be accompanied by a statement setting forth the qualifications of the nominee with specific reference to the research on which the nomination was based. Seven copies of this statement were required. The Charles Goodyear Lecture Committee, of which R. H. Gerke is chairman, advises that if a candidate is selected the lecture will be given at the Fall meeting of the Division. Dr. David Spence was selected as the first Goodyear Lecturer, but due to illness was unable to deliver his scheduled lecture.

PRIZE-WINNING PAPERS HEARD BY NEW YORK RUBBER GROUP

Papers awarded first, second and third prizes in the 1941 Papers Contest conducted by the New York Group, Rubber Division, A.C.S., were presented by their authors before a meeting of the group held at the Building Trades Club in New York City on October 17. In addition, the two Farrel-Birmingham movies, "Rubber at the Rouge" and "Robots and Rubber", were shown before and after dinner, respectively. Approximately 230 members and guests attended the meeting.

Titles and authors of the prize winning papers, in order of their selection, follow: *Economics of the Use of Neoprene Reclaim*, by D. F. Fraser (DuPont); *Manometric Test for Oxygen Absorption by Vulcanized Rubber*, by R. B. Johnson (Vanderbilt); *Cold Vulcanization of Rubber under Stress*, by A. W. Beucker (Manhattan Rubber). In addition, the three following papers received honorable mention: *Accelerators for Latex: Water Soluble vs. Water Insoluble*, by H. H. Abernathy (DuPont); *Trilinear Compounding*, by D. B. Forman (DuPont); *Conservation of Rubber Latex*, by R. O. Babbitt (DuPont). The papers by Messrs. Johnson, Abernathy and Forman will appear in RUBBER AGE; those by Messrs. Fraser, Beucker and Babbitt are scheduled to appear in *India Rubber World*. Judges for the contest were Charles Haynes (Binney & Smith), Harry L. Fisher (U. S. Industrial Chemicals), and Dr. William C. Geer. The first three papers were awarded $50, $30, and $20, respectively.

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Poncho Cloth Premium Allowed

The high quality demanded by the United States Marine Corps in cotton cloth used in making rubberized ponchos for troops is recognized in an amendment to the cotton grey goods price schedule announced October 5 by OPA Administrator Henderson. The schedule has been amended so that a premium of ¾-cent a yard may be added to the ceiling price of 13½ cents a yard for 40-inch combed lawn, 96 by 100, meeting the specifications for Marine Corps poncho material. The premium is intended to cover the higher costs involved in making this grade of goods. Marine Corps requirements call for high tensile strength and complete absence of imperfections.

Johnson Opens Akron Office

The Charles Eneu Johnson Co., manufacturers of pigments since 1804, recently opened an office in the First Central Tower Building, Akron, Ohio, exclusively for the sale of carbon black. J. B. Barr, who for the past ten years was sales manager of the carbon black division of the Imperial Oil & Gas Products Co., has been named manager of the new office. The C. P. Hall Company is the sole distributor of carbon black made by the Charles Eneu Johnson Co.

J. B. Barr

Ball Addresses Ontario Group

John M. Ball, of the R. T. Vanderbilt Co., and editor of the *Vanderbilt News*, was the principal speaker at a meeting of the Ontario Rubber Section of the Canadian Chemical Association, held on October 16 at the University of Toronto in Toronto, Canada. Taking as his subject, "The Effect of Temperature on the Sunlight Deterioration of a Rubber Compound," Mr. Ball reported the results of a series of experiments conducted at the Vanderbilt laboratories to determine the connection between sunlight deterioration and temperatures ranging from —30° C to 100° C. The results of all experiments were confined to a single graph. Approximately 60 members and guests attended the meeting.

A meeting of the group was also planned for November 14 at the Walper House, Kitchener, Ontario, at which Dr. William B. Wiegand, of the Columbian Carbon Co., was scheduled to deliver a talk on soft blacks. A report of this meeting will appear in the next issue. Dr. W. F. Tuley, of the Naugatuck Chemical Division of the U. S. Rubber Co., is scheduled to address the December meeting of the group which will be held in Hamilton, Ontario, the second week in December.

U.S. RUBBER CO. SPONSORS LOS ANGELES GROUP MEETING

Following the established practice of having one of the large rubber companies in the area sponsor its meetings, the United States Rubber Company sponsored the meeting of the Los Angeles Group, Rubber Division, A.C.S., held on November 4 in the Rainbow Room of the Mayfair Hotel in Los Angeles. Approximately 125 members and guests attended the meeting. U.S. Rubber also furnished all of the prizes and table favors, with Clayton Remy, factory manager, acting as master of ceremonies.

The problem of defense in the Los Angeles area was discussed by Carleton Tibbetts, vice-president of the Los Angeles Steel Casting Company. Mr. Tibbetts is also chairman of the Los Angeles City and County Division of the Defense Committee and vice-president of the Los Angeles Chamber of Commerce. He made a strong plea for a wide awake citizenry and outlined in detail the defense needs and defense efforts in Los Angeles.

A moving picture, "The Saga of the Pacific," a picture illustrating the Clipper flight to the Far East, was shown through the courtesy of the Pan-American Airways. A news report was given by Carl E. Stentz of the Latex Seamless Products Company. Eight new members were voted in. A golf program for the year was proposed by C. E. Brooks, chairman of the golf committee.

The door prize, a rubber raincoat, was won by Bob Abbott of the C. P. Hall Company; special prizes were won by John Hoerger of A. Schrader's Son, and by R. E. Pelzel of the Douglas Aircraft Corporation. The special prizes were each a U. S. Royal tire and tube.

Plans for an elaborate Christmas program are afoot for the meeting on Tuesday evening, December 2.

Akron Group Hears Dr. Troller

Dr. T. H. Troller, director of the Daniel Guggenheim Institute, was to be the principal speaker at a meeting of the Akron Group, Rubber Division, scheduled to be held on Friday, November 7, at the Akron City Club. Dr. Troller's subject was "Aeronautic Research and Military Aviation." A complete report on the meeting will appear in the next issue.

Quebec Group Holds Meeting

A meeting of the Quebec Rubber & Plastics Group was scheduled to be held on Friday, November 7, at the Faculty Club in Montreal, Canada. A talk on "The Molding of Vinyl Resins" was to have been delivered by George O. Morrison, technical service engineer of Shawinigan Chemicals, Ltd. A full report on the meeting will appear in the next issue.

NEW UNITED CARBON BUILDING IS FORMALLY OPENED

The largest office structure in West Virginia, and admittedly the last word in appointments and functional design, was formally opened by the United Carbon Company on October 17. The new building, which now houses the general offices of the company, cost $500,000 to build. Located at Kanawha Parkway and Broad Street in Charleston, it towers twelve stories in height.

The base of the exterior consists of polished black Minnesota graphite and Virginia alberene stone with metal trim in polished bronze. On the upper floors there is a facing of gold colored bricks with steel windows and door painted in glossy black. In the sidewalk around the building carbon black has been mixed with the concrete to eliminate surface glare. Structural glass doors feature the entrance.

The entrance and elevator lobby extend the entire length of the building. The lobby is faced with Belgian marble, the floor is terrazzo, and the ceiling is acoustic tile. The corridors above the first floor have rubber tile flooring and base in black and gold. These colors, used by the company in its sales promotion work, are used throughout the interior and exterior.

Miss Anne Marie Nelson, daughter of Oscar Nelson (left), president of the United Carbon Co., just after she unveiled the bronze statue symbolizing the spirit of industrious labor.

Photograph, courtesy "Charleston Daily Mail"

United Carbon's executive suite is on the twelfth floor. Quarter-sawed teakwood flexwood features the entire suite. All rooms on the floor are carpeted in chenille carpet of harmonizing colors. The furniture was especially designed. The window curtains and wall hangings were especially designed and woven. The suite comprises the president's office combined with a directors' room, a private office, a reception room, private secretary and bookkeeper offices, a small dining room, cocktail bar and kitchen.

The spirit of industrious labor is symbolized by a bronze figure located outside of the building's main entrance. It bears the inscription "From the Fullness of the Earth" and is representative of an individual with vision who takes ingredients from the earth and processes them.

Views of new United Carbon Building in Charleston, West Virginia. TOP ROW: Lower section of structure; private dining room; reception room. LEFT CENTER: Lobby hallway. BOTTOM ROW: Bookkeeper's room; building exterior; elevator doors and modernistic lobby clock. (Photographs by courtesy of "The Charleston Gazette")

CURRENT NEWS OF THE MONTH

BRIGHT FUTURE FOR SYNTHETIC PREDICTED BY GOODRICH HEAD

Although the nation has developed synthetic rubber primarily as a replacement for natural rubber in an emergency, the future of the new and fast-growing synthetic rubber industry does not necessarily depend upon replacement of natural rubber, John L. Collyer, president of the B. F. Goodrich Co., told the Cornell Society of Engineers at a meeting held in New York City on October 31.

"This statement is based on the fact that many scientists are forecasting the future in terms of an 'age of petroleum.' They make this prophecy not merely because petroleum will serve as fuel and lubrication for increasing numbers of internal combustion engines, but because crude oil is the principal source of the hydrocarbon molecule. This molecule, used in many different forms, is truly the common denominator of many of the newest developments in industrial science," Collyer said.

"Since petroleum is one of natural rubber's greatest enemies, causing it to swell and disintegrate, the development of synthetic rubber which is virtually unaffected by oils and hydrocarbon solvents means that the scope of the rubber industry's participation in this 'age of petroleum' will constantly increase," he declared.

Not Competitive to Crude Rubber

The superior characteristics of synthetic rubber for many types of service leave no question, he said, that synthetic rubber can score a notable success throughout industry without disturbing the time-honored position of natural rubber in hundreds of fields and applications where it is entirely adequate as a material.

"Practically all the synthetic rubber produced in this country today is being used for special purposes, such as in the B. F. Goodrich airplane De-Icers for military and commercial use, bullet-sealing gasoline tanks for combat aircraft, fuel hose for use in handling oil, gas masks and a score of items now flowing out of our factories to American and British armed forces," Collyer stated.

In civilian applications, synthetic rubber has already distinguished itself by making possible valuable technical advances and time and labor economies in the printing industry where synthetic rubber molded printing plates are now in wide use. It is also used in conductive compounds which avoid the hazard of uncontrolled static electricity discharges in industrial tires and other rubber products used in many industries.

Sponge Rubber for Arrows

An interesting use of sponge rubber in connection with arrows is made by the government in connection with live stock in its national forests. In the Gunnison National Forest marksmen use arrows tipped with sponge rubber balls, which are dipped in vari-colored paints, to mark or brand deer in an attempt to discover how much they move from one feeding ground to another. The "wounded" deer hardly bat an eyelid when hit because the sponge rubber deadens or dulls the blow.

FIRESTONE HEADS ADVANCE WITH THOMAS NEW CHAIRMAN

The election of John W. Thomas, president, to the chairmanship of the board, and the elevation of Harvey S. Firestone, Jr., vice-president, to the presidency, was announced by the Firestone Tire & Rubber Co. on November 8. The office of chairman has been vacant since the death of Harvey S. Firestone, Sr., founder of the company, in February, 1938. Mr. Thomas has been associated with the company since 1908 and has been president since 1932. Harvey S. Firestone, Jr., has been vice-president since 1929.

Three other advancements in the company were announced at the same time: Lee R. Jackson, vice-president in charge of sales, was named executive vice-president; John J. Shea, treasurer, becomes vice-president and treasurer; and H. D. Tompkins, assistant to Mr. Jackson, is now vice-president in charge of sales. All three have been with Firestone for a number of years.

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A meeting of the group was also planned for November 14 at the Walper House, Kitchener, Ontario, at which Dr. William B. Wiegand, of the Columbian Carbon Co., was scheduled to deliver a talk on soft blacks. A report of this meeting will appear in the next issue. Dr. W. F. Tuley, of the Naugatuck Chemical Division of the U. S. Rubber Co., is scheduled to address the December meeting of the group which will be held in Hamilton, Ontario, the second week in December.

U.S. RUBBER CO. SPONSORS LOS ANGELES GROUP MEETING

Following the established practice of having one of the large rubber companies in the area sponsor its meetings, the United States Rubber Company sponsored the meeting of the Los Angeles Group, Rubber Division, A.C.S., held on November 4 in the Rainbow Room of the Mayfair Hotel in Los Angeles. Approximately 125 members and guests attended the meeting. U.S. Rubber also furnished all of the prizes and table favors, with Clayton Remy, factory manager, acting as master of ceremonies.

The problem of defense in the Los Angeles area was discussed by Carleton Tibbetts, vice-president of the Los Angeles Steel Casting Company. Mr. Tibbetts is also chairman of the Los Angeles City and County Division of the Defense Committee and vice-president of the Los Angeles Chamber of Commerce. He made a strong plea for a wide awake citizenry and outlined in detail the defense needs and defense efforts in Los Angeles.

A moving picture, "The Saga of the Pacific," a picture illustrating the Clipper flight to the Far East, was shown through the courtesy of the Pan-American Airways. A news report was given by Carl E. Stentz of the Latex Seamless Products Company. Eight new members were voted in. A golf program for the year was proposed by C. E. Brooks, chairman of the golf committee.

The door prize, a rubber raincoat, was won by Bob Abbott of the C. P. Hall Company; special prizes were won by John Hoerger of A. Schrader's Son, and by R. E. Pelzel of the Douglas Aircraft Corporation. The special prizes were each a U. S. Royal tire and tube.

Plans for an elaborate Christmas program are afoot for the meeting on Tuesday evening, December 2.

Akron Group Hears Dr. Troller

Dr. T. H. Troller, director of the Daniel Guggenheim Institute, was to be the principal speaker at a meeting of the Akron Group, Rubber Division, scheduled to be held on Friday, November 7, at the Akron City Club. Dr. Troller's subject was "Aeronautic Research and Military Aviation." A complete report on the meeting will appear in the next issue.

Quebec Group Holds Meeting

A meeting of the Quebec Rubber & Plastics Group was scheduled to be held on Friday, November 7, at the Faculty Club in Montreal, Canada. A talk on "The Molding of Vinyl Resins" was to have been delivered by George O. Morrison, technical service engineer of Shawinigan Chemicals, Ltd. A full report on the meeting will appear in the next issue.

Carbon Percentages

Where Now?

Standardization of Type Is a Prerequisite to Higher Loading

The domestic colloid Micronex is readily available

The imported colloid crude rubber is in limited supply

MICRONEX

Beads or Compressed

A COLUMBIAN COLLOID

BINNEY & SMITH CO. · COLUMBIAN CARBON CO.

DISTRIBUTOR — MANUFACTURER

Thinking Aloud About HIGHER CARBON LOADINGS

An increase of even 5% over present practice in the carbon loading of tread rubber is obviously desirable as a means of crude rubber conservation.

We believe that such increase is practicable. There are, however, a number of points to consider in approaching this problem. Employment of softer forms of channel black is very naturally the first thought in this connection. When, for example, black ratios are advanced from 50 to 55 parts it becomes important to avoid undue increase of stiffness in the uncured stock.

Carbon blacks harsher than those now used can, of course, be dismissed from consideration. Standard Micronex produces smoother extrusion and better all-around working properties than the average tread carbon. Broadly speaking, higher ratios can be used with standard Micronex than with other commonly used types of reinforcing black.

A serious obstacle to higher black loading would be introduced by variability in any given type employed. The higher the carbon ratio—the more essential is the complete control which assures uniformity.

While standard Micronex would be the first black to be thought of on the basis of these considerations, regard must be had for the entire compounding and processing set-up of a given plant. Other types of Micronex are available which offer greater compounding leeway in special instances.

Our Technical Service Department will gladly cooperate in regard to the special needs of each individual situation.

BINNEY & SMITH CO. • COLUMBIAN CARBON CO.

DISTRIBUTOR MANUFACTURER

MICRONEX MEANS MORE MILEAGE

NEW UNITED CARBON BUILDING IS FORMALLY OPENED

The largest office structure in West Virginia, and admittedly the last word in appointments and functional design, was formally opened by the United Carbon Company on October 17. The new building, which now houses the general offices of the company, cost $500,000 to build. Located at Kanawha Parkway and Broad Street in Charleston, it towers twelve stories in height.

The base of the exterior consists of polished black Minnesota graphite and Virginia alberene stone with metal trim in polished bronze. On the upper floors there is a facing of gold colored bricks with steel windows and door painted in glossy black. In the sidewalk around the building carbon black has been mixed with the concrete to eliminate surface glare. Structural glass doors feature the entrance.

The entrance and elevator lobby extend the entire length of the building. The lobby is faced with Belgian marble, the floor is terrazzo, and the ceiling is acoustic tile. The corridors above the first floor have rubber tile flooring and base in black and gold. These colors, used by the company in its sales promotion work, are used throughout the interior and exterior.

Miss Anne Marie Nelson, daughter of Oscar Nelson (left), president of the United Carbon Co., just after she unveiled the bronze statue symbolizing the spirit of industrious labor.

Photograph, courtesy "Charleston Daily Mail"

United Carbon's executive suite is on the twelfth floor. Quarter-sawed teakwood flexwood features the entire suite. All rooms on the floor are carpeted in chenille carpet of harmonizing colors. The furniture was especially designed. The window curtains and wall hangings were especially designed and woven. The suite comprises the president's office combined with a directors' room, a private office, a reception room, private secretary and bookkeeper offices, a small dining room, cocktail bar and kitchen.

The spirit of industrious labor is symbolized by a bronze figure located outside of the building's main entrance. It bears the inscription "From the Fullness of the Earth" and is representative of an individual with vision who takes ingredients from the earth and processes them.

Views of new United Carbon Building in Charleston, West Virginia. TOP ROW: Lower section of structure; private dining room; reception room. LEFT CENTER: Lobby hallway. BOTTOM ROW: Bookkeeper's room; building exterior; elevator doors and modernistic lobby clock. (Photographs by courtesy of "The Charleston Gazette")

RUBBER SAFETY SECTION NAMES OFFICERS FOR 1941-42 SEASON

The following officers were selected for the 1941-42 season by the Rubber Section of the National Safety Council at the 30th National Safety Congress and Exposition, held in Chicago, October 6-10: *General Chairman,* Ralph Farnum (U. S. Rubber, Detroit); *Vice-Chairman in Charge of Program,* John L. Grider (American Hard Rubber); *Secretary,* K. C. Loomis (Ohio Rubber). J. E. Lovas (U. S. Rubber, Passaic) was named News Letter Editor.

Chairmen appointed to head various committees follow: *Engineering,* J. J. Raytkwich (U. S. Rubber, Mishawaka); *Health,* Dr. W. S. Ash (U. S. Rubber, Detroit); *Membership,* J. J. Loge (General Tire); *Publicity,* Paul Van Cleef (Van Cleef Bros.); *Statistics,* Roland Kastell (U. S. Rubber, New York).

Members at large for the coming season include the following: E. W. Beck (U. S. Rubber, New York), R. A. Bullock (Corduroy Rubber), Oliver Hopkins (U. S. Rubber, Providence), C. F. Horan (Hood Rubber), W. H. MacKay (Dunlop), Urban L. Moler (Inland Div., General Motors), R. M. Morse (Firestone), William Spanton (American Hard Rubber), R. M. Weimer (Dayton Rubber). Messrs. Beck, Bullock, Horan and Morse are past general chairmen.

Facts on Firestone Fire

It has now been established that the Rubber Reserve Company lost a total of 15,850 tons of crude rubber in the fire which severely damaged the plant of the Firestone Rubber & Latex Products Co. at Fall River, Mass., on October 11-12. The reserve company had a total of 17,850 tons of rubber stored at the plant but 2,000 tons escaped damage. According to Firestone officials, buildings and machinery devoted to the manufacture of defense products, with the exception of leak-proof gasoline fuel tanks, were unharmed. It is interesting to note that the serious fire hazard presented by the storage of large quantities of crude rubber, particularly at the Firestone Fall River Plant, was stressed by the National Fire Protection Association only a few days before the fire.

Yerzley Leaves DuPont

Felix L. Yerzley, associated with the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., for the past five years in the capacity of physicist, has left that company and is now with the Engineering Department of the Pioneer Instrument Division, Bendix Aviation Corp., Bendix, N. J. Dr. Yerzley has been a consistent contributor to the meetings of the Rubber Division, A.C.S., and is also an active member of the A.S.T.M., A.S.M.E. and the S.A.E. He is the present chairman of the A.S.M.E.'s Subdivision on Rubber and Plastics.

To Operate Powder Loading Plant

The General Tire Engineering Co., subsidiary of the General Tire & Rubber Co., will operate the powder loading plant now under construction by the Ordnance Department of the U. S. Army at Jackson, Miss. Ground for the plant, which will cost approximately $11,000,000, was broken on October 18.

FINANCIAL

Boston Woven Hose & Rubber Co.

Year Ended Aug. 31: Net earnings of $616,911, equal after payment of the regular preferred dividends of $6.00 per share to $6.65 a share on the 86,000 shares of common stock outstanding, which compares with $281,796, or $2.75 a share, in the previous fiscal year. Sales amounted to $9,147,319, an increase of $2,445,374, or 36.5%. Total current assets as of August 31, 1941, amounted to $4,644,373, including $457,574 in cash, $600,000 in treasury bills, and $50,000 in defense bonds, and total current liabilities to $797,558, a ratio of 5.8 to 1, which compares with $4,043,788 and $357,021, respectively, at the end of the previous fiscal year.

New Jersey Zinc Co.

Third Quarter: Net profit of $2,519,490, after all charges and tax provisions, equal to $1.28 a share on 1,963,264 capital shares, which compares with $1,796,195, or 91c a share, in the corresponding quarter of 1940. For the first nine months of the current year the company showed a net profit of $7,033,390, after all charges and Federal taxes, equal to $3.58 a share.

Dewey & Almy Chemical Co.

First Nine Months: Consolidated net profit of $361,664, after provision of $502,800 for taxes, equal after preferred dividends to $2.46 each on 226,117 common shares. This compares with $422,603, or $1.59 a share, reported for the corresponding 1940 period. Gross sales totalled $5,588,073 and $4,130,401, respectively.

Anaconda Wire & Cable Co.

Nine Months Ended Sept. 30: Net income of $2,146,580, according to a preliminary income account, equal to $5.09 each on 421,981 common shares, which compares with $917,845, or $2.18 a share, in the corresponding period of the previous year.

Baldwin Rubber Co.

Third Quarter: Net income of $101,068, equal to 32c each on 315,254 shares, which compares with $81,476, or 26c each on 315,754 shares, in the corresponding quarter of the previous year.

COMMITTEE INVESTIGATING CHEMICAL WORKERS' STATUS

After years of refraining from taking any stand on employer-employee problems among professional workers in the chemical industry, the Board of Directors of the American Chemical Society on October 18 announced the appointment of a special committee to consider the whole question of employment in professional work in the field of chemistry and to foster sound relationships between employers and employees. The committee will be known as the Committee on Economic Status.

The membership of the new committee includes Drs. Lawrence W. Bass, Walter A. Schmidt, George Calingaert, Harlan L. Trumbull and Dean Frank C. Whitmore of Pennsylvania State College. Dr. Trumbull is director of chemical research for the B. F. Goodrich Co.

A minimum starting salary of $1500 a year has been recommended by the Society's directorate for "chemical internes." For chemists who have attained "professional status" the board suggested a minimum of $2400 a year. In making the recommendations, the board stressed the point that neither suggestion was intended to fix a maximum or to establish a wage scale.

Extender for Rubber Cement

Extenderex, a new compounding ingredient for use with naphtha rubber cements in the coating and combining of fabrics, has been introduced by the Malrex Chemical Co., Malden, Mass. The new material, offered in the form of an aqueous compound, permits the extension of a rubber film by maintaining the initial viscosity of the cement. In coating work, cements compounded with the new material may be used as a back coat or as a first or second coat over which a coat of ordinary rubber cement may be applied. In combining work, the addition of Extenderex to the cement is said to increase adhesion and impart a firm handle to the cloth. A soft handle may be produced by the use of a special plasticizer offered by the company.

Texas Rubber Company Formed

The Arrowhead Rubber Company of Texas has been organized with Stirling Atchison, formerly with the Kirkhill Rubber Company of Los Angeles for 11 years, as general manager, and Frank L. Shew, formerly with the Darnell Corporation, Long Beach, as plant superintendent. The new company has leased the plant of the old I. G. Bell Rubber Company at Dallas and will confine itself strictly to national defense orders. The plant has about 12,000 square feet of floor space and is slated to get into production about November 20 with 75 employees. Included in equipment is a 60-inch mill and 14 presses.

NAMES IN THE NEWS

PER K. FROLICH, Director, Esso Laboratories, Standard Oil Development Co., WALTER S. LANDIS, vice-president, American Cyanamid Co., and C. M. A. STINE, vice-president, E. I. du Pont de Nemours & Co., are included among those proposed for president-elect of the American Chemical Society. R. H. GERKE, research chemist, U. S. Rubber Co., and past chairman of the Rubber Division, has been proposed for councilor-at-large.

ALVIN FUHRMANN, associated with the technical sales department of the Midwest Rubber Reclaiming Co. since 1937, has been transferred from the Detroit territory to the plant at East St. Louis, Ill.

O. M. HAYDEN, assistant manager, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., delivered a talk on the status of synthetic rubber before the American Society of Mechanical Engineers at Louisville, Ky., on October 13.

ARTHUR W. CARPENTER, manager of testing laboratories, B. F. Goodrich Co., Akron, has been appointed to the A.S.T.M. committee which will select the Edgar Marburg Lecturer for 1942. DR. HARRY L. FISHER, of U. S. Industrial Chemicals, Inc., was the lecturer for 1941.

THEODORE M. MILLER, who has been in charge of the consumer testing department of Foster D. Snell, Inc., Brooklyn, N. Y., has been granted a leave of absence to assume a position with the Office of Price Administration at Washington, D. C.

HARRY W. HICKS, sales manager of Holland-Rantos Co., Inc., New York City, has assumed the additional duties of assistant general manager for that company.

C. A. KLAUS, director of automotive replacement sales, and CARL A. SCHELL, chief sales and development engineer, of the Thermoid Co., Trenton, N. J., have both been appointed vice-presidents of the company.

FRANK SEAMANS has been elected president of the Barber Asphalt Corp., succeeding J. E. AUTEN, resigned. E. R. RITER, secretary, was named a vice-president, filling the vacancy caused by the elevation of MR. SEAMANS.

KENNETH GOODYEAR, direct descendant of Charles Goodyear, the discoverer of vulcanization, is now employed in the footwear plant of the U. S. Rubber Co. at Naugatuck, Conn.

LEE J. BORNHOFEN, manager of sales promotion for the Goodyear Tire & Rubber Co., Akron, has been "loaned" to the O.P.M. in Washington for an indefinite period to help organize the new industrial promotion section of that organization. The new section is under the Division of Contract Distribution.

HENRY MINOR, formerly associated with the Dayton Rubber Mfg. Co. and the U. S. Rubber Co., has been named development engineer for the Trenton, N. J., plant of the National Automotive Fibres, Inc.

W. L. FINGER, who was released from his duties with the Rubber Manufacturers Association to devote his full time to defense work with the Office of Production Management, and who resigned from the latter organization recently, has returned to the Association in his former capacity.

W. E. PALMER, secretary and assistant treasurer, Seiberling Rubber Co., Akron, was reelected Grand Recorder of the Grand Commandery of Ohio Knights Templar at the 99th annual conclave of that organization recently held in Columbus, Ohio.

J. W. DEVINE, formerly associated with John Royle & Sons, Paterson, N. J., has jointed the staff of L. Albert & Son, Trenton, N. J., dealers in new and used rubber machinery and equipment.

ELMER K. BOLTON, chemical director, E. I. du Pont de Nemours & Co., associated with the development of neoprene, was presented the Chemical Industry Medal for 1941 on November 7 at a joint meeting of the American Section of the Society of Chemical Industry, the New York Section of the A.C.S., and the New York Section of the American Institute of Chemical Engineers held at the Chemists' Club in New York City.

NORMAN A. RUSTON, affiliated with Emery Industries, Inc., Cincinnati, Ohio, since 1930, and manager of the chemical sales division since July, 1940, was named general manager of the company last month. He succeeds EDWIN W. REESE, recently killed in an automobile accident.

GUY GUNDAKER, JR., associated with the B. F. Goodrich Co. since 1924, has been named manager of the store administration department of that company. He succeeds WILSON C. BRAY who resigned to join the Ferguson-Sherman Mfg. Corp., Dearborn, Mich., as general sales manager.

Kern Assistant to Curtis

Ervin S. Kern, associated with the sales staff of the R. T. Vanderbilt Company since October, 1932, first with head-

Ervin S. Kern

quarters in Chicago and more recently in Detroit, has been named assistant to E. B. Curtis of that company at the New York headquarters, 230 Park Avenue. Mr. Kern majored in chemistry and chemical engineering at the University of Missouri, spent a short time in the laboratories of the Empire Oil Refinery at Okmulgee, Oklahoma, and was employed by Goodrich for six years before joining Vanderbilt. Mr. Kern's sales activities in the Detroit territory have been taken over by John R. Shroyer, whose experience includes ten years spent with the Inland Manufacturing Division of General Motors at Dayton, Ohio, and five years with the Fisher Body Co., Detroit, where his attention was given to automotive rubber parts.

GEORGE W. HUGGETT has been appointed president and managing director of Canadian Industries, Ltd., to succeed the late ARTHUR PURVIS. MR. HUGGETT, who is a director of Dunlop Tire & Rubber Goods Co. and Canadian Lastex, Ltd., among other companies, assumed Mr. Purvis' duties when the latter was granted leave of absence in December, 1939, to carry out special war work.

SHERMAN H. DALRYMPLE, president of the United Rubber Workers of America, has been appointed an alternate member of the Defense Mediation Board.

ROBERT HERSHEY, associated with the control laboratories of the Rustless Iron & Steel Co., Baltimore, Md., for the past several years, has joined the research laboratory of the Barrett Co., Edgewater, N. J.

NEWS IN BRIEF

U. S. Rubber delivered its first barrage balloon to the Army Air Corps last month. The balloon, 76 feet long by 28 feet in diameter, with a capacity of 28,500 cubic feet, designed to fly at about 7,000 feet, was shipped from the company's experimental plant at Naugatuck, Conn., to Fort Sill, Oklahoma.

Swan Rubber Co., Bucyrus, Ohio, has started operations in its newly completed plant addition which will employ approximately 200 when in full operation. Total employees at the plant now number 465.

Instructions for the stabilization of a price of 13¾d a pound for plantation standard grades of rubber were issued to the London market by the British Government last month. This move follows the introduction of the government import monopoly for rubber last May.

The value of crude rubber, including latex, imported into the United States during the first six months of 1941 amounted to $191,085,000, according to the U. S. Chamber of Commerce, which compares with $136,793,000 for the corresponding period of the previous year. The value represented 12.6% of the total value of all imports in the period.

Plans to construct a plant for the manufacture of chlorinated hydrocarbon solvents on a recently acquired 23-acre site at Wyandotte, Michigan, have been announced by E. I. du Pont de Nemours & Co. The plant will be operated as a unit of the R & H Chemicals Department.

Melflex Products Co., manufacturer of stair treads and other safety devices, has moved its plant from 222 Merriman Road to 415 Wheeler Lane in Akron, Ohio.

Employees engaged in retreading or recapping tires for interstate commerce must generally be paid the 40-cent an hour minimum wage recently established for the rubber products manufacturing industry, according to an announcement by Baird Snyder, deputy administrator of the Department of Labor's Wage and Hour Division.

To protect its domestic rubber manufacturing industry against the upward price tendency of crude rubber, the Government of Brazil has designated the Bank of Brazil to control rubber prices. A restriction on imports was recently imposed to assure the domestic industry of sufficient supplies of crude rubber.

Most of the answers to the question "Why are the supplies of zinc limited?" will be found in a new pamphlet issued by the New Jersey Zinc Co. under the title "Zinc in Defense." Copies of the pamphlet are available on request to the company at 160 Front St., New York City.

Rubber collecting and distributing concerns in Malaya have reached an agreement to eliminate competitive practices which have been restricting the flow of rubber to the United States. The fact that there is now only one single buyer—the Rubber Reserve Co.—led to excessive competition.

Approximately 50% of automobile tires turned into dealers for retreading or recapping are fit only for the junk pile, according to George J. Burger, independent tire dealer consultant. Mr. Burger based the percentage on a study of 2,796 tires submitted to one dealer over a period of months for retreading or recapping.

The Ohio Supreme Court on October 16 refused to review the decision of the Common Pleas Court of Cuyahoga County holding that the Goodyear Securities Co., a holding company organized by Edgar B. Davis, was the owner of certain money and stock which the Seiberling family sought to secure on the grounds that the company was merely a "trustee" of the money and stock which rightfully belonged to F. A. Seiberling.

The Super Champion Tire, which will give remarkably long mileage due to the addition of "Vitalin," a new rubber vitamin, in its tread and cord body, has been introduced by Firestone. The new tire features the company's safti-stop gear-grip tread.

The "Rain-Set," consisting of a neat jacket with matching trousers, has been introduced by the Ironall Factories Co., Cincinnati, Ohio. The sets, for either boys or adults, are made of rayon cordura fabric treated with Pliosheen to provide waterproofing. The sets fold into a package approximately 5 x 8 inches in size.

The latest issue of *The Royle Forum*, house organ of John Royle & Sons, Paterson, N. J., is devoted to a discussion of the various synthetic rubbers now in use. Some of the company's equipment adaptable to the extrusion of synthetic rubber products is illustrated and described.

Steps Up Fuel Tank Production

The Firestone Tire & Rubber Co., Akron, lays claim to being the first of the rubber manufacturers to step up output of bullet-sealing fuel tanks for airplanes by utilizing tire-making equipment. By fabricating tank parts along its regular tire production lines and by introducing the use of curing molds for the first time, Firestone is said to eliminate three days of drying time, necessary under previous methods, in addition to guaranteeing a permanent sealing of all parts of the tanks to withstand the heaviest machine gun fire. Firestone is making these tanks at Akron, Fall River and Los Angeles.

Conductive Rubber Flooring

For use in munitions and other plants where in many floor areas surfaces must be an excellent conductor of static electricity, spark resistant and at the same time withstand the chemical action of ether, alcohol, nitric, sulfuric or hydrochloric acids, as well as the chemical action of explosives in powder, gaseous or liquid form, the Goodyear Tire & Rubber Co., Akron, has announced a conductive rubber flooring. The new flooring is black, made in four thicknesses with smooth, plate finish that may be cleaned with steam, clear lukewarm water, or water to which ammonia has been added.

A pamphlet containing important directions for the shipment and storage of liquid latex, Lotol and Dispersite has jointly been issued by the Naugatuck Chemical Division of U. S. Rubber Co. and Dispersions Process, Inc., both located at 1230 Sixth Ave., New York City. Copies are available from either company on request.

Imports of crude rubber into the United States during September amounted to 81,743 long tons, a decline of 23% from the preceding month. The September figure includes 330 tons of guayule and 3,252 tons of latex. Government stocks during September increased to 243,251 tons.

A new type hose for all standard paint and lacquer spraying equipment, with inside diameters from ¼ to ½ inch and outside diameters from ½ to ⅞ inches, with the tube built of Ameripol, is announced by the B. F. Goodrich Co., Akron. Construction in the ½ inch inside diameter type is two-braid, while all other sizes are one-braid.

LifeGuard Safety Tubes, made by the Goodyear Tire & Rubber Co., Akron, are now equipped with fast-inflating valves which permit inflation as quickly as with conventional tubes. All of the safety features of the present grommet type have been retained.

O.P.M. UNIT IS ORGANIZED TO SALVAGE WASTE MATERIALS

The primary function of the recently created Bureau of Industrial Conservation of the Office of Production Management will be to save and salvage every possible pound of every usable material, including rubber and synthetic rubber, and to direct such waste and secondary materials into defense channels in line with the previously determined policy of the Supply Priorities and Allocations Board. Lessing J. Rosenwald, a Sears-Roebuck executive, heads the new bureau.

Mr. Rosenwald's responsibility is to integrate in his office conservation efforts formerly sponsored by the conservation section of the O.P.M. and certain parts of the former O.P.A.C.S. The widespread and varied field of conservation, specifications, salvage, and simplification of design are now all centered in a single unit, directly under Mr. Rosenwald's direction.

Avoidance and elimination of waste and the unnecessary use of vital raw materials represents an important phase of the effort of S. P. A. B. to meet all legitimate military requirements first, while keeping essential civilian economy in such working order that emergency dislocations may be minimized and an ultimate return to normalcy may be made less difficult.

The Bureau of Industrial Conservation will operate along several broad lines, including revision of Government specifications; avoidance of waste in industrial practices; promotion of the use of substitute materials where they are available; stimulation of the collection of salvage; simplification of service and manufactured goods, and general elimination of all non-essential uses of materials in which shortages exist or may be imminent.

Instrumental Methods Discussed

The October, 1941, issue of the *Analytical Edition* of *Industrial and Engineering Chemistry*, official journal of the American Chemical Society, is devoted to a monograph on "Instrumental Methods of Chemical Analysis," prepared by Ralph Holcombe Muller. The monograph gives in detail the use in analysis and testing which is today being made of various types of modern instruments. An extensive bibliography is given. Also included in the issue is a directory of instruments and related apparatus.

Establish Research Fellowship

Godfrey L. Cabot, Inc., Boston, Mass., has established a research fellowship at Johns Hopkins University, Baltimore, Md., for the academic year 1941-42 for further study of surface area measurements by adsorption techniques. The program is under the direction of Professor P. H. Emmett.

Owen Buckets Speed Reclaiming

Pictured herewith is an Owen Bucket, product of the Owen Bucket Co., Cleveland, Ohio, as used to speed the reclaiming of rubber at the Naugatuck, Conn., plant of the Naugatuck Chemical

Division of U. S. Rubber Co. The bucket, of the rehandling type, is hung from the end of a crane mounted on a mobile truck which can be moved to various locations in the yard. The bucket "bites" deep into the sea of used tires, which in this case are 20 to 30 feet deep and extend over many acres, and the tires are then loaded and conveyed from the yard to the plant for processing.

Meeting Set for December 4

The date for the next meeting of the Subdivision on Rubber and Plastics of the American Society of Mechanical Engineers has been set at Thursday, December 4. The meeting will be held at the Hotel Astor in New York City, in conjunction with the meeting of the parent society. Non-members as well as members of the Society are invited to attend the sessions, which will feature three technical papers and a report on advances in rubber and plastics during 1941. The complete program appears in the October, 1941, issue of RUBBER AGE.

Dedicate Monument to Goodrich

A granite monument was dedicated to the memory of Dr. Benjamin Goodrich, founder of the B. F. Goodrich Co., in Ripley, N. Y., on November 4. Dr. Goodrich, one of the pioneers of the domestic rubber manufacturing industry, was born in Ripley, on the shores of Lake Erie, on November 4, 1841. Col. David M. Goodrich, chairman of the B. F. Goodrich Co. and son of the founder, and John L. Collyer, president, participated in the ceremonies.

AUTO ALLOTMENT PLAN OFFERS SAVINGS IN VITAL MATERIALS

A 14-point plan for automobile allotment, designed to release millions of pounds of raw materials for national defense needs and at the same time keep civilian transportation wheels rolling, was outlined by Joseph W. Frazer, president of Willys-Overland Motors, to S.P.A.B. and other government officials at Washington on October 16. Mr. Fraser is a member of the Automobile Advisory Committee of the O.P.M.

The basic feature of the new plan calls for the production of only the lightest weight car or series now being built by each parent automobile manufacturer. It also calls for the allocation of production on the basis of critical material used, volume needed for successful operation, and the number of dealers dependent on the manufacturer. Deluxe models would be eliminated and only two-door and four-door sedans produced.

According to Mr. Fraser, adoption of the plan would result in the saving of 317,456,172 pounds of steel, 72,769,325 pounds of iron, 26,378,879 pounds of rubber, and 38,203,894 pounds of miscellaneous materials, such as lead, copper and zinc. In addition, it would result in a gasoline saving of approximately 300,000,000 gallons a year, since each transportation unit would deliver higher mileage.

Savings in rubber, according to the plan, would result from the fact that all tires would be of the smallest size possible for the specific weight of the vehicle, elimination of all accessories except those in purely functional parts, and elimination of rubber floor mats with substitutions made with linoleum, imitation leather, hemp, or other less critical materials.

Form Rubber Corp. of America

A new rubber manufacturing organization, called the Rubber Corporation of America, has been organized. The new concern has taken possession of the plant of the former Climax Rubber Co., located at 274 Ten Eyck Street, Brooklyn, N. Y., and is already engaged in the production of defense orders. The corporation has also purchased the machinery and patents of the former Dickinson Tire Co. Officers of the Rubber Corporation of America include Col. Waldemar Kops, president, and Solomon Z. Melup, vice-president and general manager.

Cabot Opens Akron Office

In order to maintain closer and more frequent contact with its customers and prospects in the Ohio area, Godfrey L. Cabot, Inc., manufacturers of Spheron carbon black, have opened an office in Akron at 710 Peoples Bank Building. W. D. Anderson will be in charge of the new office. The company's headquarters are in Boston, Mass.

LOS ANGELES NEWS

The new building to house the defense equipment factory set-up at the U. S. Rubber Company plant is well under way. The new building, one story steel and brick, will measure 260 by 870 feet. The new carbon black bulk handling set-up is also nearing completion.

The offices and store of the Rubbercraft Corporation of California have been improved with a complete installation of fluorescent lighting. Charles N. Merralls, president of the company, has completed a new home on Ledo Island near Manhattan Beach.

The Golden State Rubber Mills, 651 East 61st Street, has added a number of men to its factory personnel during the last few months. I. D. Blumenthal, president, scheduled to arrive in Los Angeles from the east late in October was delayed but was due in Los Angeles about the middle of November.

A second installation of braiding equipment within the last few months has been completed by Western Insulated Wire, Inc. This increases the capacity by about 50 per cent. The plant is now fully equipped for manufacture of all types and sizes of electric wire for national defense projects or equipment. A new department has been set up headed by a priority report expert to assure the company of accuracy in priority matters.

U. S. Keim who has been editor of the California edition of *The Wingfoot Clan* for some years has resigned to take a position as assistant personnel manager with the Norris Stamping and Manufacturing Company, 960 E. 61st Street.

The Mihm Rubber Company, 1172 E. Slauson Avenue, is busy turning out a capacity output of its oil well swabs, an item which is reaching large proportions. M. C. Stone has charge of the factory. E. L. Kennedy, proprietor, has returned from a business and pleasure trip to San Francisco and other points north.

Billy Stone, son of M. C. Stone of the Mihm Rubber Company, who achieved a reputation as a boxer during a year's stay in Van Wert, Ohio, having become district lightweight champion in that area, has returned to Los Angeles to make his home.

Bill Reeder, head of the purchasing department for the U. S. Rubber Company in Los Angeles, is back on the job after laying off for a few weeks to rest up.

L. D. Tompkins, vice-president of the U. S. Rubber Company, spent a few days in Los Angeles late in October.

Carl Stuber, manager of Akron and subsidiary shipping and warehouse plants for the Goodyear Tire and Rubber Company, spent several days in Los Angeles in October talking over business problems with Gene Beattie, manager of the shipping room, and with "Pop" Ecki, manager of merchandise distribution here.

Plans are being rapidly formulated by T. Kirk Hill for the proposed new building at the plant on St. Andrews Street. This plant is now devoted wholly to extrusion work. The new addition will be 130 by 60 feet.

"Doc" White, for 17 years machine shop foreman in the Goodyear plant here, has been promoted to manager of the tool designing department in the new Goodyear aircraft plant in Arizona.

Urges Synthetic Expansion

The immediate appropriation of $500,000,000 by the government for the construction of sufficient plants capable of producing 1,000,000 tons of synthetic rubber annually from petroleum, thus making the United States self-sufficient for its needed supply of rubber, was urged by Dr. Gustav Egloff, director of research for the Universal Oil Products Co., at the opening session of the Thirty-ninth Convention of the National Petroleum Association at the Hotel Traymore in Chicago on September 17. He claimed that stepping up output to such a point would make it possible to sell synthetic rubber profitably at 25 cents a pound.

Forms Delco Rubber Corp.

Frank W. DeLuca, formerly associated with the operation and management of the Empire Rubber Corporation, of Worcester, Mass., has organized the Delco Rubber Corporation at 115 West Main Street, Millbury, Mass. Mr. DeLuca sold his interest in Empire Rubber to his former associates recently. The new company, it is understood, will manufacture proofed goods.

Celebrates 25th Anniversary

The firm of M. Rothschild & Co., 80 Broad St., New York City, celebrated its 25th anniversary earlier this month at a luncheon given to the trade on November 3 at Busto's Restaurant. Marcus Rothschild, founder and president of the company, agents and brokers in crude rubber and related materials, presided at the luncheon.

OPA Price Announcements

Recent actions of the Office of Price Administration, of which Leon Henderson is director, of special interest to the rubber industry included the following:

Acetone and normal butyl alcohol (butanol) have been brought under the price ceilings in schedules announced on October 21. The acetone schedule sets a price of 7c a pound, delivered in tank-car lots in eastern territory, which is the price which prevailed in the third quarter of the current year. In the butanol schedule, a ceiling price of 10¾c a pound is set for tank-car lots delivered in the same territory.

Base maximum prices of 11½c a pound for crude glycerine (80% glycerol) and 18c a pound for refined glycerine became effective on November 10. These prices, which apply to deliveries throughout the United States except one specific area (certain parts of Oregon and Washington, Nevada, Arizona, New Mexico, part of Colorado, Utah, Wyoming, Idaho and Montana) in which a 2c per pound premium is allowed, compare with prices of 18c for crude and 21½c for refined previously quoted for fourth-quarter delivery.

Somerville to Address Chicago

Dr. A. A. Somerville, head of the rubber department of the R. T. Vanderbilt Co., New York City, will present a paper on "Weather Aging" before the Chicago Group, Rubber Division, A.C.S., at a meeting to be held on Thursday, February 5. The paper will represent the first presentation of a report on work on weather aging conducted by the Vanderbilt laboratories over a period of several years. Reservations for the meeting should be made with the group's secretary, B. W. Lewis, c/o Wishnick-Tumpeer, Inc., 435 No. Michigan Ave., Chicago.

Plan to Develop Brazil

A vast program for developing the Amazon basin of Brazil both agriculturally and industrially with financial aid from the United States has already taken shape to the extent that informal talks have been held with Brazilian authorities regarding the sending of experts from this country to make a comprehensive survey. The plans call for the development of rubber plantations, establishment of variegated farming, building of factories and the resettlement of Brazilians in the Amazon region.

New Rubber Firm Functioning

Rubber Latex Products, Inc., 1745 Front St., Cuyahoga Falls, Ohio, recently organized by H. A. Morton and M. M. Harrison, both of whom were formerly associated with the Miller Rubber Division of the B. F. Goodrich Co., is now in full operation. Included among products being manufactured is surgical tubing. Additional products are expected to be added at an early date.

CANADIAN NEWS

Canadian Resins and Chemicals, Ltd., has been formed as a jointly owned subsidiary of the Shawinigan Water and Power Company and Union Carbide and Carbon Chemicals Corporation.

Construction of a plant for the manufacture of polyvinyl chloride and of copolymers of vinyl chloride and vinyl acetate is well under way at Shawinigan Falls, Quebec, and the plant is expected to be in production in the spring of 1942. The materials produced will be the same as those sold in the States under the trade name of "Vinylite."

Officers and directors of the new company are J. A. Raffert, president of the board of directors; V. G. Bartram, president and director; J. G. Davidson, J. W. McLaughlin, H. W. Matheson, and H. S. Reid, vice-presidents and directors; J. F. H. McCarthy, secretary; and J. A. Fuller, treasurer.

Herbert Horsfall, president of Canada Wire and Cable Co., Ltd., has been elected a director of Consumers' Gas Company, of Toronto. Mr. Horsfall is also vice-president of the Leaside Engineering Company and a director of General Steel Wares, Ltd.

The resignation of W. A. Eden as president of Fairmont Company, Ltd., as reported in the October RUBBER AGE, has brought forth the following statement from Hon. C. D. Howe, minister of munitions and supply:

"Up to the present, Fairmont Company, Ltd., have purchased reserves of rubber to meet government needs. With the wider responsibilities which have now been placed on the company it became essential that the head office should be in close proximity to the rubber industry, which is largely located in the vicinity of Toronto. Unfortunately Mr. Eden's extensive responsibilities and interests in Montreal do not permit him to act on behalf of my Department in Toronto. Therefore, I have regretfully been obliged to accept his resignation."

Mr. Eden is president of the Dominion Rubber Co., Ltd., whose head offices are in Montreal.

Mr. Jeffries, the new president of Fairmont, which is the Crown Company charged with sole responsibility for building up a rubber reserve in the Dominion and with distribution of all rubber among war and civilian industries, is also the president and general manager of the Viceroy Manufacturing Co., Ltd., Toronto. For many years he has been treasurer of the Rubber Association of Canada. Mr. Jeffries, who was born in Peterborough, has been associated with the Canadian rubber industry ever since his graduation from the University of Toronto in 1918. It was in that year that he joined the Canadian I.T.S. Rubber Company, predecessor of the organization which he now heads.

J. Penfield Seiberling, president of the Seiberling Rubber Company, Akron, Ohio, recently visited that company's Canadian factory at Toronto and officially opened the new $100,000 addition to the present plant.

M. A. Reinhart, technical manager of the B. F. Goodrich Company, Ltd., Kitchener, had real cause for celebration on Columbus Day this year. A new son, David Allen, was born to the Reinharts on October 12.

Recent visitors at the Canadian Goodrich factory have included J. H. Daniell and D. G. Benson. Mr. Daniell, former technical manager of the plant and now technical manager of the Euzkadi factory in Mexico City, returned to Kitchener with his wife for a vacation visit. Mr. Benson, who is now a member of the company's Akron compounding staff but will shortly become chief compounder at the new factory in Cuba, made a study of special processing methods in use in the Canadian plant.

C. W. "Cal" Beaman, who was at one time manager of tire construction at Canadian Goodrich, and later was managing director of Banloc S.A.R., at Ploesti, Rumania, will be manager of the new Cuban factory which is expected to be in operation early next year.

According to a report from the Dominion Bureau of Statistics, the fifty-two Canadian establishments manufacturing, tires, footwear, etc., had a total production in 1940 valued at $83,020,721. This compares with $69,945,471 reported for 1939. The output of tires and tubes was considerably higher at $41,634,221, while that of footwear declined to $19,528,586.

Materials used by the Canadian rubber industry in 1940 had a total value of $38,228,145, compared with $28,814,003 in 1939, and included the following: rubber, including gutta-percha, $17,553,598; reclaimed rubber, $1,084,528; scrap rubber, $188,566; latex, $585,082; carbon black, $746,240; clays and earths, $90,867; ground mica, $10,984; solvents, $210,013; sulfur, $75,219; soapstone, $4,029; whiting, $106,119; zinc oxide, $605,604; talc, $17,587; barytes, $36,659; other chemicals, etc., $2,238,982.

Firestone Donates Rubber Seeds

One million rubber seeds from the company's plantations in Liberia were turned over to the Department of Agriculture on October 24 by the Firestone

Tire & Rubber Co. for trans-shipment to Brazil. The seeds were part of shipments totalling more than 2,000,000 seeds in all which are being sent from the Firestone plantations to many of the rubber experimental stations that have been established under U. S. Government auspices in twelve Central and South American countries. In the accompanying photo, Harvey S. Firestone, Jr., recently elected president of the company, is seen presenting the shipment to Dr. E. W. Brandes of the Bureau of Plant Industry of the Department of Agriculture.

Chicago Office for Revertex

The Revertex Corporation of America, which maintains headquarters in Long Island City, N. Y., announces the opening of a permanent office in the Monadnock Building, 53 West Jackson Boulevard, Chicago, Ill. Donald W. Hoover, who has been doing technical sales work for the company for the past year, is in charge of the new office. Mr. Hoover, who received his technical education at the University of Alabama, was associated with the Providence, R. I., plant of U. S. Rubber in charge of latex sundries and metal coating production for seven and one-half years prior to joining Revertex last year.

Correction

In a story in the preceding issue concerning the arrival in this country of the Messrs. Henry and Oscar Ghez from France it was stated that the brothers could be reached in care of the Rubber & Plastics Products Co., 261 Broadway, New York. This was incorrect. They can be reached in care of the Rubber & Plastics Compounds Co., Inc., 157 Chambers St., New York, which has no connection with the other concern.

Economies in England

Among suggestions for economies in the use of rubber chemicals in short supply in England are mixed fatty acids and naphthenic acid which are to take the place of stearic acid, according to the London correspondent of *Canadian Chemistry & Process Industries.* If accelerators with good anti-aging properties are used, the consumption of antioxidants may be considerably reduced. Similarly, suitable choice of fillers is helping to save pigments.

Several coal-tar derivatives lend themselves for use as substitutes of pine tar. French chalk and Spanish kieselguhr may be saved by use of locally produced clay. Anhydrous calcium sulphate provides an alternative for China clay and barytes. Further economies may be possible if a softer grade of raw rubber than customary is used.

Technical Booklets Available

Four new technical booklets were recently made available by the West Java Proefstation, West Java, Buitenzorg, N.E.I. Three of these deal with the organic analysis of Hevea latex, being devoted to ammonia-amines and betaines, alcaloids in whole-latex rubber, and fatty acids, resin acids, sterols and wax-alcohols, respectively, all three being the work of R. F. A. Altman. The fourth booklet is entitled "Properties of Mixtures of Asphaltic Bitumen and Rubber for Roadway Purposes," by G. J. van der Bie and P. Th. Wijnhamer. All of the booklets, which are reprints of articles appearing in recent issues of *Archief voor de Rubbercultuur,* are printed in Dutch with English summaries. Copies are available without cost on request to the Proefstation.

Offer Neoprene Base Cements

A line of neoprene base cements, under the trade-name of the N Series Cements, has been developed by the Union Bay State Co., Cambridge, Mass. These cements are said to be readily adaptable to practically every known adhesive, coating and impregnating operation involving all types of materials, including fabric, leather, rubber, plastics, glass, wood and metal. The cements, which are applicable for tank linings, vulcanize at room temperature, are non-thermoplastic and non-gelling, oil and chemical resistant, pressure sensitive, and can be painted, sprayed or dipped on materials. They will not support combustion.

Hold Technical Seminar

The Fleet Sales Division of the General Motors Corporation held a Technical Maintenance Seminar at the General Motors Proving Ground near Detroit, Mich., on September 11. The seminar was attended by more than 700 representatives of leading motor vehicle fleet users, including several officers of the U. S. Army. Included among the papers given was one by Sidney M. Cadwell, director of tire development for the U. S. Rubber Co., on "The Importance of Rubber and Its Possible Impending Shortage." Reprints of this paper may be secured without cost from the Department of Public Relations, General Motors Corp., Detroit, Mich.

Takes Over Wax Crayon Sales

Standard Chemical Co., Akron, Ohio, recently took over the manufacture and sale of the wax crayons formerly handled by the Crayon Department of the Monsanto Chemical Co., St. Louis, Mo. Standard also manufactures and distributes a variety of rubber compounding ingredients, including softeners and plasticizers.

Take Over Triplewear Assets

Triplewear, Inc., a new company with Irvin Levine as president and Samuel Pudlin as secretary and treasurer, has been formed and has taken over the brake lining business, equipment, raw material, stock, good will and trade names of the Triplewear Brake Linings Corp., Paterson, N. J.

Plans New Reclaiming Plant

Plans for a new rubber reclaiming plant, to be located in the east, and which is scheduled to get into operation early in 1942 with an initial capacity of ten tons daily, have been revealed by David Schrage, 1650 Broadway, New York City. Mr. Schrage, who operated rubber factories in Poland, Lithuania and Latvia prior to the outbreak of European hostilities, is also the founder and president of the Compania Industrial Cubana de Gomas, S. A., which recently started the manufacture of rubber footwear at Matanzas, Cuba. The new reclaiming plant will use the alkali process.

Industry sales of pneumatic farm service tires will reach an all-time high of $34,000,000 in 1941, according to John L. Collyer, president of Goodrich. This compares with $22,000,000 in 1940 and $18,000,000 in 1939.

The British Rubber Publicity Association, 19 Fenchurch St., London, E.C. 3, England, has rendered its third annual report. The report indicates continued effort in the agricultural field. Copies are available from the Association on request.

OBITUARIES

Joseph E. Stone

Joseph E. Stone, president and treasurer and one of the founders of the Kleistone Rubber Co., Warren, R. I., recently died as the result of a fall caused by shock. Mr. Stone was born in Marblehead, Mass., on January 31, 1876, and received his education in the public schools. His first work in the rubber industry was with the Hood Rubber Co., with which company he was associated for 14 years, largely in the capacity of cashier and assistant treasurer. In 1913 he joined Plymouth Rubber Co. as treasurer and director and remained with that concern until he helped organize Kleistone Rubber, one of the pioneer firms in the manufacture of rubber tile flooring. Mr. Stone was a member of the Rubber Manufacturers Association and the Rhode Island Rubber Club among other affiliations. He leaves a wife, two sons and two daughters.

Theodore E. Smith

Theodore E. Smith, founder of the *India Rubber Review,* predecessor of *Tire Review,* now owned and published by Edward S. Babcox, and legal counsel to A. Schrader's Son Division of Scovill Mfg. Co., died at his home in Brooklyn, N. Y., on October 26 at the age of 80. Mr. Smith was born in New York City but for a period of almost thirty years was prominent in the business and civic affairs of Akron. He served as president of the former Akron Standard Savings Bank and as district governor of the Akron Rotary Club. He was also active in the Better Akron Federation. He leaves a son, Theodore, Jr., and a daughter, Mrs. W. F. Russell, wife of Dr. W. F. Russell of the R. T. Vanderbilt Co.

Mrs. Edith H. Partridge

Mrs. Edith Harpham Partridge, wife of Albert G. Partridge, president of the Goodyear Tire & Rubber Co. of Canada, Ltd., died at the home of her sister, Mrs. Mark Murdock, in Akron, Ohio, on October 29, at the age of 63. Mrs. Partridge, a member of a prominent Akron family, lived in England for a number of years while her husband served as managing director of Goodyear's plant at Wolverhampton and later took up residence in Canada when Mr. Partridge became head of the Canadian subsidiary. In addition to her husband, Mrs. Partridge leaves a son and two daughters.

USMC Lining Trimming Machine
Model B

USMC Lining Trimming Machine

Model B

THE USMC Lining Trimming Machine—Model B, is especially designed for trimming the surplus lining of Rubber Boots, Pacs, Lumbermen's Boots and Gaiters.

This machine not only insures uniform trimming, but does the work more economically than any other method.

It has an individual motor drive and is portably mounted allowing the work to be handled efficiently.

A number of these machines are being used in various Rubber Footwear Factories with excellent results.

Machines are sold outright.

Write to the nearest branch for prices and further particulars.

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863

NEW EQUIPMENT

Continuous Extruding Machine

A new large capacity continuous extruding machine for rubber or plastics and other thermoplastic compounds has been announced by the National-Erie Corp., Erie, Penna. The new extruder is available with plasticizing cylinders from 3½ to 12-inch diam-

eter and equipped with corrosion resisting linings of extraordinary hardness. Cylinders are completely jacketed for high temperature operation, and are skillfully baffled to provide "progressive heating" of the material passing through the processing chamber. Periphery of stock screws, specially developed for plastics, are protected against wear by the application of a new hard surfacing alloy which does not check or crack when subjected to wide variations in temperature. Improved axial type extruding heads suitable for tubes or straight extruding of miscellaneous commercial shapes are standard equipment on all National Erie extruders. For insulating service there is a choice of screwed, bolted or hinged crossfeed head constructions with adequate provisions for cleaning and adjustment and maintenance of precision settings required on this type of operation. Machines are driven through enclosed transmissions with all gearing straddle mounted between heavy duty roller bearings and automatically lubricated.

Sectional Steam and Air Bags

Strands of steel piano wire replace the usual cotton cords in sectional steam and air bags just recently developed by the Firestone Tire & Rubber Co. for tire repairing work. These new bags will give the tire repairman more than double the service life provided by cotton cord bags commonly used in tire repair molds, according to Firestone.

The wire, being unaffected by heat, does not break down under the high temperatures of long cures as does the cord fabric. After the wire bag has been in service a long time and has grown rough from usage it can be retreaded to assure an additional number of smooth repairs. Because the new bag does not lose its shape by "growing" in length as does a cotton cord bag it always provides first-class repairs. Tests of the new type bags show that some still are in good con-

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(EQUAL PARTS)

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dition after 700 cures; the average increase in number of cures with wire bags, compared with cord bags, is well over 100 per cent.

The longer service life results from use of steel wire, which is ten times stronger than cotton cord and which will not disintegrate at high curing tempera-

tures. Because only a few wires are calendered in every inch of rubber, more gum rests between the wires to increase the lateral stretch and the overall flexibility of the bag.

In the past, bags have been built with from two to seven plies of cotton cord fabric. The new wire bags, in passenger sizes, have only one ply. The cotton cord bags have a tendency to buckle in the mold, and these buckles open up and lead to early failures in service. Firestone's new method of building the wire bag prevents such buckling.

ADVERTISEMENT

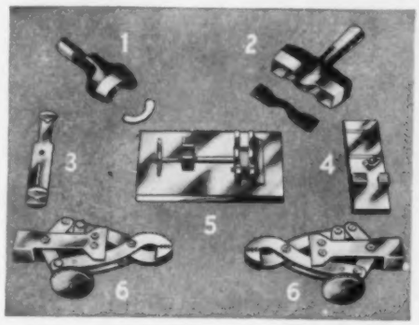
You should try HYCAR, Marshal Petain. It resists heat better.

See page 149

Tear Resistance Test Equipment

All of the items shown in the accompanying illustration are products of the Akron Equipment Co., Akron, Ohio. They are designed to facilitate the making of tear tests on rubber specimens according to the procedure of the A.S.T.M. (D-624-41-T), approved by the Society in June, 1941.

The principal innovation in the new method is the



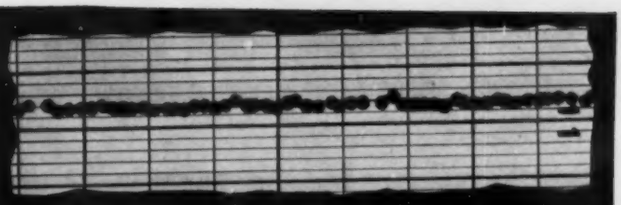
substitution of a single central nick in the specimen, in the place of the former multiple radial nicks. The new equipment will make the new single nick with speed and accuracy in both Type "A" (Fig. 1 in the illustration) and Type "B" (Fig. 2) specimens. To prepare specimens for the testing machine, at least three transverse and three longitudinal samples should be punched out from the sheet and then clamped, three at a time, in the quick acting vise (Fig. 5). The vise is provided with guides for the single blade knife holder (Fig. 3). The vise is open in construction to speed up loading and unloading and is designed to work most efficiently with the prescribed three specimens (from .070-inch to .110-inch thick each), permitting them to be nicked simultaneously.

After the single blade is set by means of the depth gauge (Fig. 4) so that it extends out of the knife holder exactly .020-inch, the holder should be run back and forth over the specimens in the vise, nicking them uniformly as required. The specimens are then ready for pulling on the test machine. For this operation, pincer type jaws (Fig. 6) can be used. These jaws are said to afford a more positive grip than the toggle or roller type jaws commonly used on most testers. These jaws, incidentally, have many other additional laboratory uses.

The knife blade holder, depth gauge and vise are made of white bronze and are highly polished. The pincer type jaws are made of steel, nickel-plated and polished. Akron Equipment points out that the single vise (Fig. 5) may be used interchangeably with both Type "A" and "B" specimens.

New Cramer Timer Relays

The R. W. Cramer Co., Inc., Centerbrook, Conn., has introduced two new time relays, designated as Types RSIC and TDIC, respectively, both of which have wide application for the automatic control of industrial process and machine operations. The new relays are synchronous motor operated timers which either keep an electrical circuit closed for a preset



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a CALCINED MAGNESIA that is always UNIFORM

*Temperature chart above shows unvarying temperature (never more than 5° variation) in the special, custom-built electric ovens that manufacture Baker's Light Calcined Magnesia. This is the major reason for:

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2 UNIFORM DISPERSION with IMPROVED STABILIZING EFFECT.

3 UNIFORM QUALITY—that is maintained in MOISTURE PROOF PACKAGING.

These are qualities Neoprene Compounders *must* have in a Calcined Magnesia. They are qualities you *get* in Baker's Light Calcined Magnesia. Baker, in many years of producing purity products to definite physical and chemical specifications, has learned the art of *exactness* and of manufacturing to small tolerances.

Strong, 4-ply bags, asphalt-interlined and tape-sealed—and corrugated, waterproof cartons—guard against moisture infiltration.

More than that, Baker has gone a step further to safeguard delivery of *uniform* Calcined Magnesia. Moisture-proof packages bring you this product with its uniform quality *maintained.*

Investigate Baker's Light Calcined Magnesia—manufactured especially for the exacting needs of Neoprene Compounders. Test it in wetting power—in ease of dispersion—stability of compounded stock—rate of cure—tensile strength and plasticity. Learn why Baker's Light Calcined Magnesia is better. Send for free samples.

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The years following the 1941 Exposition will be a critical period in the lives of all who promote production for defense. The wealth of ideas and information made available here will help materially to our progress through the present emergency. This year, attendance is a "must". Don't miss it. Be sure to come—bring your associates.

18th EXPOSITION OF CHEMICAL INDUSTRIES

GRAND CENTRAL PALACE, NEW YORK, DEC. 1-6, 1941

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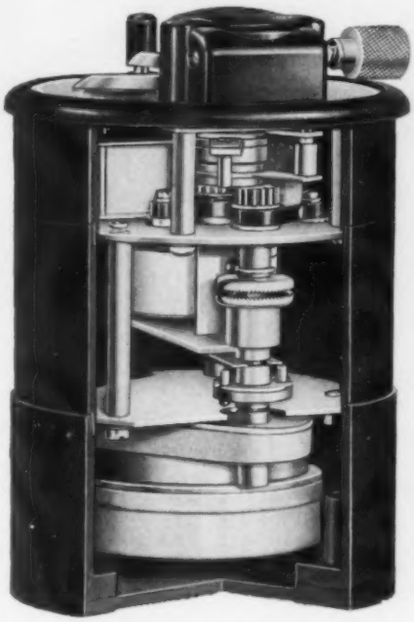
568

time interval or, in the case of the TDIC, can be used as time delay relays which when energized keep a circuit open for a selected interval. These timers have an instantaneous reset feature and when restarted they repeat the timing without manual resetting. They are



Cramer RSIC Timer

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See page 149

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, and MARCH 3, 1933, of THE RUBBER AGE, published monthly at East Stroudsburg, Pa., for October 1, 1941.

State of New York }
County of New York } ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Peter P. Pinto, who, having been duly sworn according to law, deposes and says that he is the Business Manager of The Rubber Age and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers, are:

Publisher, Palmerton Publishing Company, Inc., 250 W. 57th St., New York City; Editor, M. E. Lerner, 250 W. 57th St., New York City; Managing Editor, None; Business Manager, Peter P. Pinto, 250 W. 57th St., New York City.

2. That the owner is (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given):

Palmerton Publishing Company, Inc., 250 W. 57th St., New York City; P. L. Palmerton, 250 W. 57th St., New York City; Earl D. Osborn, 40 E. 30th St., New York City; Peter P. Pinto, 250 W. 57th St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holders appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stocks, bonds, or other securities than as so stated by him.

PETER P. PINTO, Business Manager.

Sworn to and subscribed before me this 16th day of September, 1941.

[SEAL] JOHN A. ENRICO, Notary Public.
(My commission expires March 30th, 1943.)

REVIEWS

BOOKS, BOOKLETS, CATALOGS, Etc.

The St. Lawrence Survey. Part III. Potential Traffic on the St. Lawrence Seaway. U. S. Department of Commerce, Washington, D. C. 6 x 9 in. 342 pp.

This latest report in the series being issued by the Department of Commerce dealing with the economic aspects of the St. Lawrence Seaway and Power Project is concerned principally with the possibilities of commercial traffic through the proposed seaway and analyzes rates and cost advantages of it as compared with alternative means of transportation. The report is in two sections, the first devoted to an extensive discussion of overall results of the study and the second comprising a series of 17 separate studies, each of which is devoted to an analysis of a different commodity or a group of related commodities suitable for transportation via the seaway.

Crude rubber is of course one of the commodities discussed in the second section of the report. After discussing imports and consumption of crude rubber in the United States, and analyzing consumption geographically, the report concludes that states and sections of states contiguous to the Great Lakes, which will benefit materially from the construction of the seaway, account for approximately 65.4% of crude rubber consumption. At present, the bulk of crude rubber consumed in the tributary area now moves all-rail from North Atlantic ports, principally from New York. Specific economic advantages to be gained by shipping this rubber via the new seaway are outlined in the report.

•

Standards on Textile Materials. Published by the American Society for Testing Materials, 260 So. Broad St., Philadelphia, Penna. 6 x 9 in. 387 pp. $2.00.

In addition to all of the 68 specifications, tolerances, tests and definitions pertaining to textile materials this publication gives a great deal of other pertinent information, including extended abstracts of four technical papers covering synthetic textile fibers, merit of three rayon taffetas in consumer service, testing breaking strength of fabrics by the pendulum and inclined plane machine, and a correlation between laboratory abrasion tests and service life of men's and women's outerwear. Appendices include extensive photomicrographs of common textile fibers, yarn number conversion tables, psychrometric table for relative humidity, and a glossary of terms relating to textile materials. Five proposed standards are published for information.

•

The Kinetics of the Polymerization of Isoprene on Sodium Surfaces. By J. L. Bolland. British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C. 3, England. 6½ x 10 in. 20 pp.

Although an increasing amount of study has been devoted in recent years toward gaining a better understanding of the fundamental nature of polymerization reactions, little attention has been directed toward one very important type of polymerization, *i.e.*, the polymerization of conjugated compounds in the presence of alkali metals. The kinetic method was therefore applied by the author to the polymerization of isoprene on sodium as a representative example of this class of reactions. The results of his research are presented in this booklet, which is a reprint of the article of the same name published in a recent issue of the *Proceedings of the Royal Society of London.*

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Molding Technic for Bakelite and Vinylite Plastics. Bakelite Corp, 30 East 42nd St., New York City. 8½ x 11 in. 224 pp. $3.50.

This latest edition, fourth to be issued, contains factual data covering molding practices for both hot-set and cold-set molding plastics. Topics covered include principles of molding, proper mold and product design, molding plant layout, heating media, finishing molded parts, accessory equipment, molding plant cost accounting. One chapter is devoted entirely to conversion tables, mensuration formulae, steam and pressure tables, and other valuable engineering data. There are approximately 175 photographs and line drawings. Although treating specifically with Bakelite and Vinylite plastics, this technical manual can well be considered as a guide to the use of all plastics.

•

Oxidation of Unvulcanized Rubber in Light. By J. T. Blake and P. L. Bruce. Simplex Wire & Cable Co., Cambridge, Mass. 8½ x 11¾ in. 4 pp.

Reproduced from the September, 1941, issue of *Industrial & Engineering Chemistry*, this booklet describes a method and apparatus for the quantitative study of the rate of oxidation of raw rubber. Reference is made to various methods previously used to show that the tackiness developed during the exposure of unvulcanized rubber to light is due to oxidation. No proof has heretofore been submitted that tackiness is proportional to the extent of oxidation and all previous results were qualitative, based on individual judgment. The conclusion is drawn that the rate of oxidation is retarded by materials not usually associated with the inhibiting oxidation in rubber.

•

Rubber. United States Tariff Commission, Washington, D. C. 6 x 9 in. 16 pp.

The possibilities of producing rubber in the United States and those of rubber conservation are detailed in this booklet, issued in the nature of a report. Data on the current status of reclaimed rubber, synthetic rubber and guayule is given. Methods of increasing the production of all three of these materials are discussed. The booklet represents an up-to-date report on the situation confronting the domestic rubber manufacturing industry at present.

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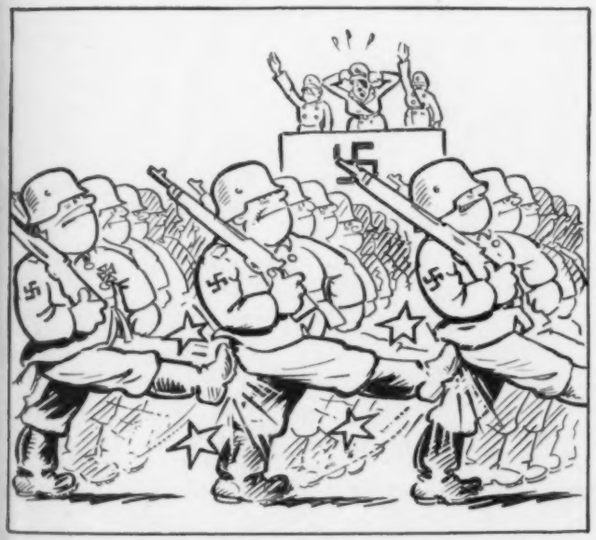

"You'll have to stand that abrasion, boys, since we can't get HYCAR," bemoans Adolph.

See page 149

ZOPHAR

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REVIEWS (CONT'D)

Abbé-Blutergess Turbine Sifter. (Bulletin No. 52). Abbé Engineering Co., 50 Church St., New York City. 8½ x 11 in. 8 pp.

The complete line of Abbé-Blutergess turbine sifters made by the company, which find application in rubber compounding as well as in the reclaiming of rubber, is illustrated and described in this new bulletin. These sifters operate at relatively high speed in an entirely different manner from conventional mechanical sifters. Instead of depending for screening or separation on a vibrating, shaking or pulsating action, the material is fed through a regulating feeder into the bowl or hopper at the top of the sifter whence it flows into the turbine ports. Diagrams in the bulletin depict the unique operation.

•

The Proteins of Hevea Brasiliensis. II. Analysis of a Product Isolated from Crepe Rubber. By G. R. Tristram. British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C. 3, England. 6¼ x 10 in. 4 pp.

This booklet, a reprint from a recent issue of *The Biochemical Journal*, discusses the isolation of a protein from crepe rubber and its analysis for amide-N, tyrosine, tryptophan and the basic amino-acids. The investigation was undertaken to check or refute earlier researches on the proteins of *Hevea brasiliensis*. The work was carried out as part of the program of fundamental research on rubber undertaken by the Board of the British Rubber Producers' Research Association.

•

Aerosol Wetting Agents. American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York City. 8½ x 11 in. 80 pp.

This booklet, exceptionally well laid out and printed, presents in a clear and factual manner the characteristics and methods of applications of the Aerosol wetting agents. After discussing the various types available, the booklet gives data on solubility, surface tension, interfacial tension, action in acids and alkalies, and calcium tolerance. Information on foaming, emulsions, metallic salts, wetting and spreading, capillarity and penetration, and applications is also given. Liberal use is made of charts, graphs, photographs and tables. A complete bibliography is included.

•

Neville Coal-Tar Solvents. Neville Co., Neville Island, Pittsburgh, Penna. 6 x 9 in. 40 pp.

This booklet contains data on the grades, specifications and uses of standard coke oven light oil distillates and special coal-tar solvents marketed by the Neville Co. The testing methods used by the company in controlling its solvents with regard to distillation, flash point, color, aniline point, etc., are described. In addition, the booklet contains specific gravity and temperature conversion tables.

•

Ti-Pure R. Krebs Pigment & Color Corp., Wilmington, Delaware. 9 x 6 in. 16 pp.

The properties of Ti-Pure R, the new rutile form of titanium dioxide, are described and discussed in this booklet, with particular reference to the use of the new pigment in paint systems. The availability of the rutile form of titanium dioxide will permit the production of coatings of greater opacity than was possible previously, according to the booklet.

•

Facts About Towmotor. Towmotor Co., 1226 East 152nd St., Cleveland, Ohio. 8¾ x 11¼ in.

This catalog consists of a number of separate pamphlets, each describing the advantages of various Towmotor models featured by the company. Operating data, including capacity, height of lift, tilt, overall length and wheelbase, is furnished for each model. Specific industrial uses are illustrated.

Properties of Ameripol D. B. F. Goodrich Co., Akron Ohio. 8½ x 11 in. 8 pp.

This catalog section on Ameripol D, the Goodrich synthetic rubber used in the manufacture of mechanical rubber goods, is featured by four tables, the first comparing the properties of natural and synthetic rubbers, the second listing the properties of typical Ameripol D vulcanized compounds, the third giving the per cent volume increase of natural and synthetic rubbers after 48 hour immersion in various solvents, and the fourth constituting a rough guide to determine where the use of Ameripol is practical. General properties of Ameripol D are also discussed.

•

Carbon Black in Reclaim Bearing Tread Stock. By F. H. Amon and H. H. Offutt. Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. 8½ x 11 in. 8 pp.

This booklet gives the results of a study conducted primarily to determine the electrical conductivities of four grades of Spheron carbon black compounded in stocks containing a moderate percentage of reclaim, and, secondarily, to determine the stress strain and abrasion resistance properties which such stocks impart. Formulas used are given. Results are shown in both table and graph form.

•

High Duty Magnetic Clutches and Combination Clutch-Brakes. Stearns Magnetic Mfg. Co., Milwaukee, Wisconsin. 8½ x 11 in. 20 pp.

A wealth of engineering data on the application of magnetic friction devices, with dimension drawings, tables of specifications and pictures of installations showing the ready adaptability of magnetic clutches and clutch-brake units for near or remote control in industrial use, is given in this new catalog. The special engineering service offered is outlined.

•

Nopak Cylinders. Galland-Henning Mfg. Co., Milwaukee, Wisconsin. 8½ x 11 in. 12 pp.

Specifications, dimensions, operating information and other data on the line of Nopak cylinders for air or hydraulic service marketed by the company are given in this new bulletin. An outstanding feature of the bulletin is the large size and easy legibility of the detail drawings. Complete technical data on each model is furnished.

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HYCAR will take care of that swellhead of yours, Benito.

See page 149

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GAMMETER'S
ALL STEEL **ALL WELDED**
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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, NOVEMBER 10, 1941

Crude Rubber

ACTIVITY in the "free" rubber market has been practically stagnant in the past thirty days, with offerings ranging from 23¼ to 23⅛ cents for spot. Renewed factory interest, however, has been noted in the past few days. With plantation rubber prices almost pegged to a definite degree a good deal of interest in recent months has centered on Para rubber. This market has not been particularly active, the chief reason for which is the fact that there are insufficient quantities available in the face of the firm demand from both domestic and foreign rubber manufacturers. Because of this situation and in an effort to protect its own rubber manufacturing industry against an upward price trend, the Brazilian government recently designated the Bank of Brazil to control rubber prices. A restriction on exports, as reported, was previously applied. It is believed that these two actions—control of exports and prices—will result in the availability of greater quantities of Para, all of which is earmarked for American consumption once the demands of the Brazilian rubber manufacturing industry are satisfied. Quotations in the outside market follow:

As of November 10

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.23⅛
No. 2	—	@	.22⅞
No. 3	—	@	.22⅝
No. 4	—	@	.22⅜
Thin Latex Crepe	—	@	.25¼
Thick Latex Crepe	—	@	.25
Brown Crepe, No. 1	—	@	.21¾
Brown Crepe, No. 2	—	@	.21½
Amber Crepe, No. 2	—	@	.21¾
Amber Crepe, No. 3	—	@	.21½
Brown Crepe, Rolled	—	@	.19¼

Latex—

Normal, per lb., carload lots	—	@	.28¼

Paras—

Up-River, fine	.29	@	.30
Acre Bolivian, fine	.29	@	.30

Balata—

Brazilian block	—	@	.10

LONDON MARKET

(London Cable Temporarily Discontinued)

Scrap Rubber

The market for scrap continues steady with demand from reclaimers unabated. Scrap rubber dealers report that collections are picking up as the government's conservation and salvage plans are being put into actual operation. If collections meet present anticipations then it is believed that current price levels wil remain steady for some time to come. There have been no changes in the price structure since our last report. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton 32.00	@	33.00
Mixed auto	ton 16.50	@	17.00
Beadless tires	ton 22.00	@	23.00
Clean solid truck tires	ton 37.50	@	40.00
Boots and shoes	ton 28.00	@	30.00
Arctics, untrimmed	ton 24.00	@	26.00
Inner tubes, No. 1	lb. .11	@	.12
Inner tubes, No. 2	lb. .07¼	@	.07⅝
Inner tubes, Red	lb. .07⅜	@	.07⅞

Reclaimed Rubber

Demand continues unabated for reclaimed rubber with no change in the situation seen for the next several months. Reclaimers report that scrap seems to be fairly plentiful with a slight tightening up noted in a few non-volume grades. The percentage of reclaim consumption to crude rubber consumption for the month of September reached 44.8%. The price on red tube reclaim has advanced one cent a pound since our last report. Current quotations follow:

Shoe

Unwashed	lb. .07	@	.07¼

Tube

No. 2 (Compounded)	lb. .10½	@	.13¼
Red Tube	lb. .13	@	.13¼

Tires

Black (acid process)	lb. .07½	@	.07¾
Black, selected tires	lb. .06½	@	.06¾
Truck, Heavy Gravity	lb. .08½	@	.08¾

Miscellaneous

Mechanical blends	lb. .04½	@	.05½
White	lb. .13½	@	.14½

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb. .42½	@	.42¾
Peeler, carded, 23/4/3	lb. .43½	@	.43¾
Peeler, carded, 15/3/3	lb. .40½	@	.40¾
Peeler, carded, 15/4/2	lb. .40½	@	.40¾
Peeler, carded, 13/3/3	lb. .39½	@	.39¾

CHAFERS

Carded, American, 1 1/16"	lb. —	@	.43
Carded, American, 1"	lb. .33½	@	.45

Cotton

High and low prices for middling uplands on the Cotton Exchange in the past thirty-day period were reached within two days of each other, high being 17.59, quoted on October 14, and low 16.59, on October 16. The 100 point drop was due to a selling wave which hit practically all market commodities due to the new crisis in the Far East as a result of which President Roosevelt called his war chiefs into executive session. The cotton price decline was the sharpest in any one day since 1935. Resumption of buying, in small lots, brought the price back to 17.07 by October 18, while the move to extend cotton loans by two years resulted in a 17.35 price on October 23. Liquidation dropped the price thereafter to lower levels, but it has given indications in the past few days of returning to the higher level, 17.34 being quoted on November 8. According to the Crop Reporting Board of the Department of Agriculture the crop for the 1941-42 season will reach 11,020,000 bales. Quotations for middling uplands on the Exchange follow:

	Oct. 11	November 10		
	Close	High	Low	Close
December	16.85	16.76	16.23	16.23
March	17.11	16.57	16.42	16.43
July	....	16.68	16.51	16.51

Sheetings

48x40	36 in.	5.50	lb.	— @	7.000
40x40	36 in.	6.15	lb.	— @	6.260
40x36	36 in.	6.50	lb.	— @	5.923
48x48	40 in.	2.50	lb.	— @	14.400
48x48	40 in.	2.85	lb.	— @	12.632
56x60	40 in.	3.60	lb.	— @	10.694
48x44	40 in.	3.75	lb.	— @	9.867

Note: These are ceiling prices, and will remain as quoted as long as cotton is in the price range of 16.43 to 16.85.

Ducks

Enameling (single filling)	lb. .40	@	.43
Belting and Hose	lb. .37	@	.38
Single filling, A grade	lb. .19	@	.20
Double filling	lb. .20	@	.21

Closing Rubber Prices on New York Commodity Exchange, Inc.

"New" Standard Contract of 10 Tons

FROM OCTOBER 11 TO NOVEMBER 10

Date	Nov.	Dec.	Jan.	Feb.	Mar.	Sales
Oct. 11	——	——	——	——	——	—
12	——	——	——	——	——	—
13	——	——	——	——	——	—
14	——	22.50	22.40	——	22.30	26
15	——	22.50	22.40	——	22.35	3
16	——	22.50	22.40	——	22.35	—
17	——	22.50	22.40	——	22.35	1
18	——	——	——	——	——	—
19	——	——	——	——	——	—
20	——	22.50	22.40	——	22.35	—
21	——	22.50	22.40	——	22.35	—
22	——	22.50	22.40	——	22.35	—
23	——	22.50	22.40	——	22.35	2
24	——	22.50	22.35	——	22.35	6
25	——	——	——	——	——	—
26	——	——	——	——	——	—
27	——	22.50	22.35	——	22.35	—
28	——	22.50	22.35	——	22.35	—
29	——	22.50	22.35	——	22.35	—
30	——	22.50	22.35	——	22.35	—
31	——	22.50	22.35	——	22.35	—
Nov. 1	——	——	——	——	——	—
2	——	——	——	——	——	—
3	——	22.50	22.35	——	22.35	—
4	——	——	——	——	——	—
5	——	22.50	22.35	——	22.35	—
6	——	22.50	22.35	——	22.35	—
7	——	22.50	22.35	——	22.35	—
8	——	——	——	——	——	—
9	——	——	——	——	——	—
10	——	22.50	22.35	——	22.35	—

EDITOR'S NOTE: Trading in futures on the Exchange, suspended on August 13, was resumed on September 15, for the sole purpose of liquidating outstanding contracts under a maximum price of 22½ cents per pound.

OVER 5,000 INDIVIDUAL HYCAR* PARTS *Used in New* FOUR-ENGINED BOMBERS!

GIANT four-engined bombers, rolling off the assembly lines in America's major aircraft factories contain more than 5,000 individual and vital parts made of HYCAR O. R.*—the All-American Synthetic Rubber.

From clips, seals and line support blocks to the lining of bullet-sealing tanks and hose, and from gaskets, packers and bearings to the jacketing of cables, millions of HYCAR-made parts are going into America's program of preparedness and preservation.

ARE YOU GETTING YOUR SHARE OF THIS MARKET?

- ★ Are *you* using HYCAR to give your products greater resistance to oil, heat, aging and abrasion?
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- ★ Do you know that HYCAR even is replacing aluminum, steel and copper?
- ★ Do you know that alone or in combination with Reclaimed Rubber, Natural Rubber, Koroseal, Vinylite and many other synthetic resins, HYCAR offers you new opportunities for greater product improvement . . . greater sales . . . and greater economy of manufacture?

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ARE YOU USING HYCAR O. R.* TO GET YOUR SHARE OF THE GROWING MARKETS FOR THESE IMPORTANT PRODUCTS?

- ★ Automobile, truck and tank seals; body bumpers; flexible gas and oil lines.
- ★ Oil-resistant insulated wire.
- ★ Oil-resistant fuel hose.
- ★ Oil and heat-resistant packers, gaskets and bearings.
- ★ Diaphragms for valves and regulators for defense.
- ★ Oil-resistant industrial tires and friction driven rolls.
- ★ Belts; oil-resistant shoes and soles.
- ★ Printing gums, rollers and blankets.
- ★ Oil and heat-resistant sponge rubber insulation; grease retainers.

The ALL-AMERICAN SYNTHETIC RUBBER HYCAR OIL RESISTANT

HYCAR* CHEMICAL COMPANY

AKRON, OHIO

*Reg. U. S. Patent Office

YOU CAN PRODUCE BETTER GOODS MORE ECONOMICALLY WITH HYCAR O. R.

CHEMICAL MARKETS

New York, Nov. 10, 1941
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.26 @	.35
A-10	lb.	.34 @	.40
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.35 @	.60
Beutene	lb.	.70 @	.75
Butyl Zimate	lb.	— @	2.15
Captax	lb.	.50 @	.55
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.45
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	— @	2.15
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Monex	lb.	— @	1.55
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.90
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	1.90 @	2.15
Rotax	lb.	.60 @	.65
Safex	lb.	1.20 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.18 @	.20
Thiocarbanilid, drums	lb.	.26 @	.35
Thiurad	lb.	— @	1.75
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Tuads	lb.	— @	2.00
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.60 @	.75
Blend B	lb.	.60 @	.75
Blend C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Zimate	lb.	— @	2.00
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)			
Blues			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.16 @	.27
Browns			
Mapico	lb.	.11 @	—
Umber, Turkey	lb.	.05 @	.06½
Greens			
Chrome	lb.	.23 @	.32
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¾ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.09¼ @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites			
Cryptone No. 19	lb.	.05¼ @	.05½
Cryptone CB No. 21	lb.	.05¼ @	.05½
Cryptone ZS-86	lb.	.07¾ @	.08
Cryptone ZS-230	lb.	.07¾ @	.08
Cryptone ZS-800	lb.	.07¾ @	.08
Lithopone:			
Albalith	lb.	.0385 @	.0410
Azolith	lb.	.0385 @	.0410
Ray-bar	lb.	.05½ @	.05¾
Ray-cal	lb.	.05¼ @	.05¾
Rayox	lb.	.13½ @	.14¼
Titanox A	lb.	.13½ @	.13¾
Titanox B	lb.	.05½ @	.05¾
Titanox C	lb.	.05¼ @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
Anaconda, lead free	lb.	.06½ @	.06¾
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
U. S. P.—7, bbls.	lb.	.09¼ @	.09¾
Zinc Oxide—French Process:			
Florence White Seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.50 @	.55
Chrome	lb.	.16 @	—
Mapico	lb.	.06¾ @	—

BLACKS
(In bags, carload lots)

Aerfloted Arrow		.0335 @	—
Certified		.0335 @	—
Certified Spheron		.0335 @	—
Continental		.0335 @	—
Dispersо		.0335 @	—
Dixiedensed		.0335 @	—
Dixiedensed 66		.0335 @	—
Excello		.0335 @	—
Furnex		.03 @	—
Furnex Beads		.03 @	—
Gastex		.03 @	—
Kosmobile		.0335 @	—
Kosmobile 66		.0335 @	—
Micronex (Amarillo)		.0335 @	—
Micronex Beads (Amarillo)		.0335 @	—
Pelletex		.03 @	—
P-33		.0475 @	—
Shell Carbon (Delivered Midwest)		.024 @	—
Supreme		.0335 @	—
Thermax		.02 @	—
Wyex		.0335 @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@24.50
Asbestine	ton	14.00	@18.00
Barium carbonate (98-100%)	ton	47.00	@49.00
Barytes	ton	22.85	@31.50
Bentonite	ton	11.00	@16.00
Blanc fixe, dry	ton	60.00	@67.50
Calcene	ton	37.50	@43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.00	@60.00
heavy	ton	45.00	@55.00
Clay, Aerfloted, Suprex	ton	10.00	@22.00
Crown (f.o.b. plant)	ton	10.00 @	—
Dixie	ton	10.00	@22.50
Langford	ton	— @	7.50
McNamee	ton	10.00	@22.50
Par	ton	10.00	@22.50
Witco	ton	10.00 @	—
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	24.00	@50.00
Kalite No. 3	ton	34.00	@60.00
Kalvan	ton	95.00	@121.00
Magnesium carbonate	lb.	.06¼ @	.09¾
Mica	ton	35.00	@44.00
Mineralite	ton	—	@30.00
Pyrax A	ton	6.50	@20.00
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Rubberol	lb.	.16 @	.16½
Silene (calcium silicate)	lb.	.04 @	.045
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00	@25.00
Whiting, commercial	ton	16.00	@26.00
Columbia Filler	ton	9.00	@14.00
Witco	ton	6.00 @	—
Wood Flour (100 mesh)	ton	30.00	@32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00 @	—
Black Diamond	ton	25.00 @	—
Genasco, solid (factory)	ton	— @	—
Hard Hydrocarbon	ton	22.00 @	42.00
Parmr, solid	ton	— @	—
Pioneer, MR. solid	ton	— @	—

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50 @	4.00
Rodo #10	lb.	4.50 @	5.00
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.39
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.23 @	.28
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61
Ty-Ply R (and S)	gal.	6.75 @	8.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	3.18 @	3.43
Nitric, 36 degrees	cwt.	5.00 @	5.95
Acids, Fatty			
Laurex	lb.	.15 @	.17½
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10 @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.10 @	2.93
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.08¼ @	.08¾
Fluxrite	lb.	.05½ @	.06¾
Para-Flux	gal.	.08½ @	.18
Para-Lube	lb.	.425 @	.48
Petrolatum, amber	lb.	.03½ @	.04½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23¾
Pine, steam distilled	gal.	.65 @	.68
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06 @	.06½
coal tar	ton	19.00	@22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	ton	20.00	@26.00
Solvents			
Acetone, pure	lb.	.07 @	.10
Benzene, 90%, tank car	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.25
Carbon, bisulfide	lb.	.05½ @	.09
Carbon tetrachloride	gal.	.80 @	1.13¼
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums	gal.	.38 @	.50
Ethylene dichloride	lb.	.07½ @	.08
Plastogen	lb.	.07¾ @	.12
Reogen (drums)	lb.	.11½ @	.23
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	.08 @	.09½
Turpentine, spirits	gal.	.85¼ @	.89¼
dest. dist., drums	gal.	.55 @	.65
Waxes			
Beeswax, white	lb.	.56 @	.58
Carnauba, yellow	lb.	.82 @	.84
Ceresin, white, dom.	lb.	.12½ @	.17
Montan, crude	lb.	— @	—
Paraffin			
Yellow crude scale, 124/126	lb.	.06 @	—
Refined, 123/125	lb.	.05¾ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	2.00 @	2.15
Exel	lb.	1.00 @	1.02
Gel	lb.	.57 @	.59
Hipar	lb.	.65 @	.67
Powder	lb.	.52 @	.54
Resin	lb.	.52 @	.54
Resin D	lb.	.52 @	.54
White	lb.	1.25 @	1.60
Albasan	lb.	.70 @	.75
Antox	lb.	— @	.56
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.52 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

LUBRICANTS—MOLD & RUBBER SURFACE

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Colite	gal.	.90 @	1.15
Dipex	lb.	.06 @	.08
Glycerized Liquid Lubricant	gal.	1.15 @	1.20
Lubrex	lb.	.25 @	.30
Mineralite	ton	—	@30.00
Mold Paste	lb.	.12 @	.18
Sericite	ton	65.00	@75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.13½
Brown	lb.	.08 @	.11½
Neophax A	lb.	.119 @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½ @	.15
Sulfur Chloride, yellow (drs.)	lb.	.03 @	.08
Sulfur, rubber makers			
Refined (bags)	cwt.	2.40 @	—
Commercial (bags)	cwt.	2.05 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

STATISTICS

Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1939	469,803	167,558,245	15.92	13,125	5,832,618	19.84	456,678
1940	780,820	303,117,726	17.33	7,060	3,197,136	20.22	773,760
1940:							
July	66,931	26,426,632	17.63	100	49,828	22.20	66,831
Aug.	70,453	27,608,883	17.49	416	183,369	19.69	70,037
Sept.	75,770	29,317,540	17.27	666	349,443	23.43	75,104
Oct.	73,179	27,975,598	17.07	316	123,216	17.38	72,863
Nov.	69,844	26,917,136	17.21	126	52,020	18.45	69,718
Dec.	94,172	36,369,973	17.24	205	94,422	20.52	93,967
1941:							
Jan.	84,201	33,370,482	17.69	292	138,009	21.11	83,909
Feb.	70,745	28,469,753	17.97	327	144,139	19.69	70,418
Mar.	84,991	34,030,846	17.88	329	163,375	22.19	84,662
Apr.	61,288	24,193,639	17.62	238	99,371	18.96	61,054
May	98,438	39,537,574	17.93	370	204,865	24.72	98,068
June	62,124	25,179,498	18.09	476	257,254	24.13	61,648
July	94,622	39,296,581	18.54	423	219,597	23.17	94,199

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1924-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	3,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	...	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1939	2,232	463,345	694	265,553	6,640	1,603,418	27,438	10,467,552
1940	3,634	758,007	648	300,500	7,451	2,449,137	33,789	14,593,466
1940:								
July	262	53,058	65	20,553	336	115,599	2,281	993,411
Aug.	297	59,464	61	22,638	701	276,642	2,278	1,022,531
Sept.	250	49,845	40	19,245	712	246,641	2,953	1,337,487
Oct.	381	77,286	70	38,092	1,150	382,168	1,156	512,153
Nov.	392	78,587	67	43,939	445	152,297	2,308	1,169,086
Dec.	278	62,586	54	39,471	1,102	341,876	3,534	1,539,957
1941:								
Jan.	447	104,128	57	32,910	698	221,911	2,184	1,019,741
Feb.	283	65,942	41	22,790	768	245,732	2,946	1,279,648
Mar.	426	98,187	36	16,147	715	258,514	1,707	774,225
Apr.	423	95,916	64	18,533	514	189,520	1,594	648,217
May	334	76,414	61	44,381	822	287,249	2,632	1,117,226
June	383	86,949	67	30,470	552	179,779	2,070	936,944
July	411	94,874	100	34,119	830	215,176	2,049	930,126

(1) Weight given in pounds of dry rubber contained in latex.
Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Including Latex)

Figures on Monthly Basis

	1934	1935	1936	1937	1938	1939	1940	1941
Jan.	39,190	46,636	48,631	50,879	31,265	47,387	58,061	65,989
Feb.	40,515	42,720	36,841	51,950	25,357	43,422	52,078	62,692
Mar.	47,003	42,153	42,813	54,129	32,389	51,416	52,454	69,024
Apr.	44,853	44,247	52,031	51,859	29,730	45,268	52,361	71,374
May	42,918	41,101	50,612	51,795	30,753	45,484	54,513	71,365
June	40,147	36,156	52,772	51,860	32,540	48,438	47,834	84,912
July	32,553	35,917	48,250	43,703	34,219	44,975	48,354	68,653
Aug.	33,216	38,775	46,777	41,506	40,552	51,740	53,307	55,365
Sept.	30,258	37,086	46,449	43,945	40,183	51,402	52,469	53,655
Oct.	31,253	41,969	49,637	38,754	42,850	57,155	59,644	
Nov.	34,748	42,310	50,433	34,025	49,050	55,677	57,716	
Dec.	36,569	42,474	49,754	29,195	48,143	49,636	59,709	
Tot.	453,223	491,544	575,000	543,600	437,031	592,000	648,500	

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks	Year	Production	Consumption Tons	Consumption % to Crude	Stocks
1931	129,690	123,000	35.1	21,714	1936	150,571	141,486	24.6	19,000
1932	75,656	77,500	23.3	16,334	1937	185,033	162,000	29.8	28,800
1933	93,587	85,000	21.2	17,780	1938	122,400	120,800	29.9	23,000
1934	108,162	100,855	22.3	20,000	1939	186,000	170,000	28.7	25,250
1935	122,948	117,523	23.9	17,000	1940	208,971	190,244	29.3	32,636

Figures on Monthly Basis

1940:									
Jan.	19,239	16,341	28.1	27,089	July	14,299	14,539	30.1	27,129
Feb.	17,938	15,629	30.0	27,962	Aug.	17,161	14,464	27.1	28,526
Mar.	17,182	16,200	30.9	27,524	Sept.	16,379	14,835	28.3	29,039
Apr.	16,518	16,573	31.7	26,492	Oct.	19,300	16,807	28.2	30,816
May	17,499	15,984	29.3	27,141	Nov.	17,636	16,312	28.3	31,459
June	16,581	15,163	31.7	27,701	Dec.	19,239	17,397	29.1	32,636
1941:									
Jan.	20,413	19,086	28.9	33,380	July	23,111	21,725	31.6	36,751
Feb.	19,506	18,222	29.1	33,654	Aug.	24,111	20,864	38.7	39,099
Mar.	22,006	19,611	28.4	35,028	Sept.	24,678	24,032	44.8	38,055
Apr.	21,574	20,427	28.6	35,336	Oct.	.....	.....	...	.....
May	22,775	21,405	30.0	35,871	Nov.	.....	.....	...	.....
June	23,790	22,559	26.6	36,265	Dec.	.....	.....	...	....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1939*	1940	1941*		1939*	1940	1941
January	38,089	40,370	45,344	August	54,025	55,346	62,944
February	34,928	37,557	42,001	September	49,505	52,297	.....
March	43,042	44,607	48,760	October	49,854	53,807	.....
April	44,264	47,683	55,154	November	47,407	49,074	.....
May	49,766	52,946	59,307	December	43,807	46,413	.....
June	50,133	55,459	58,360				
July	50,689	53,865	63,093	Total	555,509	589,424	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1929	24,141,502	1933	8,713,962	1937	22,257,798
1930	17,364,096	1934	12,255,118	1938	10,619,338
1931	11,253,800	1935	18,664,107	1939	17,471,914
1932	6,261,336	1936	20,789,504	1940	19,378,558

1941		1941		1941	
January ...	2,032,121	May	2,407,864	September .	1,811,267
February ..	2,131,211	June	2,308,986	October ...	.....
March	2,665,961	July	2,061,144	November .	.....
April	2,682,225	August	1,532,032	December ..	....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

1939	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
August	16½	16⅞	16½	16⅛	—	21½	16⅛	16⅝	16⅝	16⅞	16⅝	23	—	16⅝	16⅝	16⅞	16⅝	16⅛	—	—	16⅛	16¾	16¾	16⅝	16⅛	16⅛	—	16¾	16½	16⅛	16¼	16⅜
September	19⅞	18¾	—	24	19½	19½	19	20	22	19¾	19¾	—	27½	19¾	22	19¾	19¾	18⅛	21¾	21½	22	21¾	21¾	20	20	20	20	19¾	19¾	20	20	21¾
October	20	19½	19½	19½	19½	20½	—	—	19½	20½	—	—	20½	20½	—	20½	20½	20	20	20½	20½	20½	20½	20½	20½	20½	20	20	20½	20½	20½	19⅞
November	20⅛	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	—	—	20¼
December	20	20	—	19¾	19¾	19¾	19¾	19¾	19¾	20⅛	20⅛	20⅛	20½	20½	20⅛	20⅛	20	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	19¾	19¾	20	20	—	20
1940																																
January	19¾	19¾	19¾	19¾	19⅞	19⅞	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19⅞	19⅞	19¾	19¾	19¾	19⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	19
February	18¾	18¾	18¾	18⅝	18¾	18¾	18¾	18¾	18¾	19¼	19¼	19¼	18¾	18⅝	19	19¼	19¼	19¼	19¼	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
March	18¾	18¾	18¾	18⅝	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	19¼	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
April	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18¾	18¾	18¾	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
May	19¼	19¼	20	20⅛	20⅛	20	20	19¾	20	24	23½	23¾	23¾	24	23½	19¾	22½	22¾	22¾	20	21¼	21	23	20	20	20	20	20	20	20	21	21¼
June	21¾	21¾	21½	21½	21¾	21¾	21¾	21¾	21¾	22½	22½	22¾	22¾	22½	22½	22¾	22¾	22¾	22¾	22¾	23	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾
July	21¾	21½	20½	20½	20½	20½	20½	20¾	20¾	20½	20¾	20¾	20¾	20¾	20¾	21	21¼	21¼	21¼	21¼	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	20¾	20	21¼
August	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19½	19½	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	—	19¾
September	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝
October	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝
November	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝
December	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
1941																																
January	20⅞	—	20½	20½	19¾	19¾	20⅜	20⅜	20⅜	20⅜	20⅜	—	—	20⅜	20	20	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
February	19¾	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	20	20	—	—	20	20½	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
March	20⅜	22⅛	20⅜	21¾	21¾	21¾	21½	21½	21½	21½	22	22	22¼	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
April	22⅛	22⅛	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
May	24	23½	24	23½	23½	23½	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
June	21¾	21¾	21¾	21¾	22½	22½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½
July	23	21¾	21¾	21¾	23	22¾	22¾	22¾	22¾	22½	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾
August	23	22¾	22¾	22¾	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
September	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼
October	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝
November	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½	23½

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1913-1932

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17
1916	72.50	1920	36.30	1924	26.20	1928	22.48	1932	3.49
1917	72.23	1921	16.36	1925	72.46	1929	20.59	1933	5.96

Average Monthly Price per Pound Since 1933

	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	9.32	13.10	14.35	21.37	14.63	15.75	19.06	19.88
Feb.	10.45	12.92	15.48	21.33	14.71	15.93	18.83	20.43
Mar.	11.01	11.51	15.89	24.09	13.55	16.26	18.58	22.17
Apr.	12.10	11.55	15.98	23.44	11.84	15.87	19.16	22.74
May	13.26	12.05	15.62	21.14	11.57	16.07	21.21	23.90
June	13.51	12.57	15.85	19.29	12.57	16.37	22.20	21.88
July	14.60	12.10	16.49	18.86	15.37	16.51	21.12	22.19
Aug.	15.47	11.98	16.25	18.37	16.08	16.67	19.62	22.70
Sept.	15.36	11.55	16.46	18.55	16.15	21.24	19.28	22.57
Oct.	13.96	12.62	16.55	16.28	16.89	19.89	20.33	23.10
Nov.	13.04	13.15	17.97	14.60	16.24	20.21	21.04	
Dec.	12.98	13.28	20.01	15.41	16.05	20.01	20.76	
Average for Year	12.92	12.37	16.41	19.39	14.64	17.57	20.10	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1941 May	1941 June	1941 July	1941 Aug.	Day	1941 May	1941 June	1941 July	1941 Aug.
1	14	—	—	—	16	14 1/16	—	—	—
2	14	—	—	—	17	—	—	—	—
3	—	13 7/16	—	—	18	—	—	—	—
4	—	13½	—	—	19	14	—	—	—
5	—	13⅜	—	—	20	13 15/16	—	—	—
6	—	13⅜	—	—	21	13 7/16	—	—	—
7	—	—	—	—	22	13 7/16	—	—	—
8	—	—	—	—	23	13½	—	—	—
9	—	—	—	—	24	—	—	—	—
10	—	—	—	—	25	—	—	—	—
11	—	—	—	—	26	13⅜	—	—	—
12	—	—	—	—	27	13⅜	—	—	—
13	—	—	—	—	28	13 7/16	—	—	—
14	—	—	—	—	29	13 7/16	—	—	—
15	14	—	—	—	30	13 5/16	—	—	—
					31	—	—	—	—

Note: No quotations have been made on the London Exchange since June 6.

Average Monthly Price Per Pound

Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence	Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence
Jan.	7.077	7.926	11.793	12.415	Aug.	7.841	8.545	12.818	
Feb.	7.029	7.942	12.577	12.769	Sept.	7.918	9.634	11.964	
Mar.	6.590	8.120	11.651	13.967	Oct.	8.355	10.177	11.813	
Apr.	5.793	7.910	10.980	14.228	Nov.	8.111	11.210	11.801	
May	5.632	8.002	11.600	13.670	Dec.	8.005	11.559	11.963	
June	6.147	8.216	13.046	——	Average for Year.	7.164	8.959	12.035	
July	7.464	8.271	12.410	——					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1941 Sept.	1941 Oct.	1941 Nov.	Date	1941 Sept.	1941 Oct.	1941 Nov.	Date	1941 Sept.	1941 Oct.	1941 Nov.
1	——	17.91	16.98	11	18.54	17.50		22	17.34	17.04	
2	17.57	17.81	——	12	18.59	——		23	17.39	17.35	
3	17.91	17.74	16.99	13	18.59	——		24	17.54	17.21	
4	17.97	18.02	——	14	——	17.59		25	17.42	17.06	
5	18.01	——	17.02	15	18.41	17.29		26	17.23	——	
6	18.16	17.86	17.04	16	18.26	16.59		27	17.18	16.83	
7	——	17.75	17.20	17	18.45	16.95		28	——	16.93	
8	18.40	17.46	17.34	18	18.24	17.07		29	17.34	17.05	
9	18.61	17.37	——	19	17.98	——		30	17.48	17.14	
10	18.26	17.54	17.31	20	17.69	16.78		31	——	17.07	
				21	——	17.05					

Average Monthly Price Per Pound

	1938 Cents	1939 Cents	1940 Cents	1941 Cents		1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	8.57	8.94	11.19	10.66	Aug.	8.41	9.30	9.84	17.06
Feb.	8.91	8.97	11.10	10.87	Sept.	8.17	9.30	9.69	17.94
Mar.	8.92	9.00	10.90	11.08	Oct.	8.61	9.24	9.62	17.31
Apr.	8.76	8.87	10.89	11.48	Nov.	9.08	9.73	9.97	
May	8.50	9.56	10.33	12.97	Dec.	8.72	10.97	10.18	
June	8.38	9.88	10.72	14.66	Average for Year	8.66	9.46	10.40	
July	8.85	9.71	10.42	16.55					

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1939	1940	1941	AFLOAT 1939	1940	1941	TOTAL 1939	1940	1941
Jan.	220,727	139.304	309,411	48,210	90,285	153,169	268,937	229,589	462,580
Feb.	207.882	129.023	320.372	55,814	112,257	136,955	263,696	241,280	457.327
Mar.	201,752	134,871	338,147	55,981	113,619	140,228	257,733	248,490	478,375
Apr.	188,074	152.645	329,767	57,918	102,557	153,484	245,992	255,202	483,251
May	187,980	148,881	359,234	54,046	109,364	147,459	242,026	258,245	506,693
June	173,493	154,313	339,108	51,274	119,138	175,499	224,767	273,451	514,607
July	165,450	175,455	395,216	52,990	139,629	132,304	218,440	315,084	527,520
Aug.	152,029	194,760	446,008	66,717	141,286	90,591	218,746	336,046	536,599
Sept.	136,824	220,597	473,684	68,310	137,888	139,784	205,134	358,485	613,468
Oct.	119,404	235.353		100,500	166,837		219,904	402,190	
Nov.	105,205	250,412		114,044	158,095		219.249	408,507	
Dec.	125,800	288,864		91,095	145,950		216,895	434,814	

Note: Above figures include stocks held by United States Government.

STOCKS OUTSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Singapore and Penang	Para and Manaos	United Kingdom	United States	Total
August	40,395	1,580	25,000*	212.774	279,749
September	29,069	2,559	25,000*	241,538	298.166
October	33,613	3,084	30,000*	259,140	325.837
November	33,778	3,697	30,000*	276.943	344.418
December	26,773	2,165	35,000*	318.486	382.424
1941					
January	37,145	2,151	40,000*	309,411	388,707
February	46,913	2,510	40,000*	320,372	409,795
March	41,005	1,200	40,000*	338,147	420,352
April	42,085	2,205	40,000*	329,767	414,057
May	44,610	1,768	40,000*	364,107	450.485
June	43,263	915	40,000*	339,108	423,286
July	41,534	1,063	40,000*	395,216	477,813

* Estimated.

STOCKS INSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Malaya	N.E.I.[1]	Ceylon [1]	Other *	Total
August	39,950	38,251	9,771	4,256	92,228
September	44,730	39,614	9,384	4,124	97.852
October	42,239	37,720	9,158	4,407	93,524
November	43,693	39,267	11,675	3,997	98,632
December	48,787	48,622	11,850	4,124	113,383
1941					
January	47,198	45,137	13,196	4,329	109,860
February	55,512	48,390	14,677	4,064	122.743
March	44,432	46,492	13,841	4,210	108,975
April	53,237	46,755	14,432	4,009	118,433
May	46,511	49,184	.....	3,772	.....
June	46,758	51,319	.....	4,432	.....
July	49,666	.....	.....	4,113	.....

(1) Estates and Dealers. (*) Estimated.

RUBBER STOCKS AFLOAT

End of:	Afloat for United States	Afloat for Europe	All Other Afloat	Total Afloat
1940				
August	141,286	55,000	53,714	255,000
September	137,033	60,000	67,967	265,000
October	166,837	60,000	38,163	265,000
November	158,095	60,000	31,905	250,000
December	145,950	60,000	44,050	250,000
1941				
January	153,169	60,000	51,831	265,000
February	136,955	60,000	48,045	245,000
March	140,228	60,000	59,772	260,000
April	153,484	60,000	61,516	275,000
May	147,459	60,000	47,541	255,000
June	175,499	60,000	39,501	275,000
July	132,304	60,000	47,696	240,000
August	90,591	60,000	.....	.....

Note: *Total Afloat* figures are estimated at 1½ months' world shipments by the International Rubber Regulation Committee. *Afloat for U. S.* is supplied by the Rubber Manufacturers Association. *Afloat for Europe* is estimated. *All Other Afloat* is determined by subtraction.

TOTAL WORLD STOCKS

At End of:	1936	1937	1938	1939	1940	1941
January	600,479	454,249	549,762	497,665	433.841	753,021
February	599,355	445,265	565,833	479,578	429,551	769,193
March	583,318	447,856	586,666	460,723	447,472	783,737
April	567,172	428,249	586,291	438,252	465,345	765,521
May	541,871	413,134	568,158	429,979	470,981	777,429
June	520,255	434,250	573,136	407,640	500.774	771,229
July	519,074	445,782	580,654	418,639	547,708	799,934
August	500,520	457,462	565,394	397,345	579,119	859,329
September	493,585	470,768	551,447	396,867	631,888	.....
October	486.159	479,398	540,976	413,274	651,775	.....
November	466,491	493,266	512,196	395,217	659,308	.....
December	466,576	545,533	482,852	391,125	702,089	.....
Monthly Avge..	528,738	460,022	555,280	427,192	543,321	.....

Note: Figures prior to 1941 represent principal world stocks only, as supplied by the Department of Commerce. Figures since 1941 represent total world stocks, as compiled by the Commodity Exchange, Inc.

U. S. Tire and Tube Statistics*

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis								
Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	13,437	13,355	11,376	15,565	7,314	13,946	14,896	16.333
Apr.-June	13,565	12,597	14,892	15,834	7,380	13,759	15,636	18,310
July-Sept.	9,822	11,312	14,914	12,207	10,794	15,182	13,877	15,191
Oct.-Dec.	10,406	12,099	14,858	9,704	12,360	14,726	14,777	
Total	47,230	49,363	56,040	53,310	37,848	57,613	59,186	

Shipment Figures on Quarterly Basis								
Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,730	11,154	10,554	14,143	7,388	12,445	12,791	15,263
Apr.-June	14,998	13,473	15,940	15,741	9,564	15,107	17,595	21,277
July-Sept.	11,648	13,489	14,037	13,106	11,243	15,791	12,904	17,120
Oct.-Dec.	9,310	12,066	12.855	10.495	12,098	14,165	15,484	
Total	46,686	50,182	53,386	53,485	40,293	57,508	58,774	

Inventory Figures [2]								
Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	11.651	11,675	8,762	12,004	10,547	9,963	10,789	10,149
Apr.-June	10,219	10,755	7,556	12,081	8,337	8,632	8,871	7,088
July-Sept.	8,419	8,288	8,690	11,200	7,859	8,080	9,837	5,170
Oct.-Dec.	9,455	8,196	10,717	10,383	8,166	8,665	9,127	

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
July	4,595	4,788	5,603	5,143	4,318	6,456	8,103	9.350	6,235
Aug.	5,511	4,676	5,005	4,990	4,123	5,400	8,691	9,911	5,834
Sept.	5,076	4,413	4,583	5,658	4,462	5,264	8,080	9,837	5,170

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis								
Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	12,823	12,553	11,891	15,831	7,314	12,383	12,801	15,349
Apr.-June	13,191	11,631	14,624	15,413	7,380	11,847	13,703	17,584
July-Sept.	10,321	11,270	15,320	12,038	10,794	13,118	12,425	13,884
Oct.-Dec.	9,891	12,425	15,201	9,092	12,360	13,300	13,308	
Total	46,226	47,879	57,036	52,374	37,848	50,648	52,237	

Shipment Figures on Quarterly Basis								
Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,640	11,252	11,367	14,606	7,387	11,422	11,683	14,265
Apr.-June	14,553	11,928	15,113	15,495	9,564	13,010	14,978	18,577
July-Sept.	11,545	13,251	15,069	12,901	11,243	13,449	11,344	15,499
Oct.-Dec.	8,306	11,636	12,874	9,765	12,099	13,309	14,209	
Total	45,044	48,067	54,423	52,767	40,293	51,190	52,214	

Inventory Figures [2]								
Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,244	10,406	8,660	11,993	10,547	8,752	8,110	8,069
Apr.-June	8,795	10,050	8,075	11,833	8,337	7,549	6,848	7,010
July-Sept.	7,639	7,565	8,595	11,326	7,859	7,206	7,970	5,467
Oct.-Dec.	9,180	8,231	10,945	10,312	8,166	7,036	7,017	

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
July	3,905	4,020	5,288	4,150	3,793	5,920	7,323	7,096	6,357
Aug.	4,757	4,306	4,444	4,309	3.600	4,783	7.799	7,794	6,071
Sept.	4,457	4,099	4,152	4,991	3,952	4,796	7,206	7,970	5,467

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.
[2] Stocks held by manufacturers at end of period indicated.

Automobile Production

Year	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1929	5,358,420	4,587,400	771,020	263,295	207,498	55.797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28.750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19.144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,085	2,000,985	488,100	166,086	123,761	42,325	2,655,171
1939*	3,577,292	2,866,796	710,496	155,426	108,369	47,057	3,732,718
1940	4,469,354	3,692,328	777,026	222,984	110,126	112,858	4,692,338
1941							
Jan.*	500,863	411,233	89,630	23,195	11,990	11,205	524,058
Feb.*	485,616	394,513	91,103	23,710	10,647	13,063	509,326
Mar.*	507,805	410,196	97,609	26,044	12,093	13,951	533,849
Apr.*	462,270	374,979	87,291	27,584	12,091	15,493	489,854
May	518,748	417,698	101,050	26,585	9,840	16,745	545,333
June	520,521	418,983	101,538	25,753	8,538	17,215	546,274
July*	444,241	343,748	100,493	24,654	3,849	20,805	468,895
Aug.	147,600	78,529	69,071	17,192	3,160	14,032	164,792
Sept.	234,255	167,790	66,465	14,496	2,548	11,948	248,751

* Revised.
Note: U. S. figures represent factory sales; Canadian, production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA							NETHERLAND INDIES						
	Gross Exports	Imports	Net Exports	Ceylon	India & Burma	Sarawak	British North Borneo	Thailand	Java & Madura	Sumatra E. Coast	Other N.I.	Indo-China	Amazon Valley	All Other	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1939	553,324	177,851	375,473	61,026	15,881	24,014	11,864	41,266	72,786	117,791	181,272	65,140	13,892	22,224	1,002,629

	British Malaya [1]	N.E.I.	Ceylon [2]	India & Burma [2]	North Borneo	Sarawak	Thailand	Indo-China	Oceania	Africa [3]	Liberia	South America	Mexico (Guayule)	Grand Total
1940	540,417	536,740	88,894	23,317	17,623	35,166	43,940	64,437	2,267	10,103	7,223	17,601	4,106	1,391,834
1940:														
June	45,471	44,834	5,603	1,553	1,421	4,077	2,178	2,730	168	727	405	1,080	101	110,348
July	42,861	60,482	7,330	1,194	1,767	2,494	4,253	4,045	169	800	342	1,035	443	127,215
Aug.	45,872	45,078	8,139	1,332	1,593	2,640	4,545	7,337	285	800	308	1,233	327	120,729
Sept.	58,892	44,009	9,985	1,319	1,743	2,404	3,247	9,303	100	800	323	1,295	200	133,715
Oct.	52,767	50,139	8,127	1,841	1,693	2,564	3,355	2,082	200	800	600	1,860	200	126,228
Nov.	36,045	37,387	5,623	2,626	1,130	3,360	3,463	6,715	200	800	600	1,500	200	99,649
Dec.	56,263	35,325	10,700	3,405	1,028	3,520	5,343	9,000	200	600	813	1,427	392	128,216
1941:														
Jan.	37,804	58,593	7,858	955	2,085	2,445	2,137	9,058	333	800	750	2,103	288	125,209
Feb.	27,115	42,091	4,346	1,022	1,686	2,922	4,137	1,995	200	800	828	1,814	414	89,370
Mar.	56,651	53,233	6,074	1,285	1,154	3,726	5,712	6,286	200	800	958	2,835	250	139,164
Apr.	40,590	48,915	6,991	1,164	2,175	3,118	4,271	....	250	800	750	2,009	250	111,283
May	53,062	48,099	7,786	1,019	1,237	3,849	1,841	6,225	200	800	180	1,080	250	125,628
June	51,247	48,496	8,925	822	1,020	3,195	2,831	7,318	200	800	750	1,510	250	127,364
July	53,373	53,381	7,387	666	2,027	3,799	3,614	5,000	200	800	750	1,253	250	132,500

(1) Including Brunei and Labuan; figures shown represent rubber which has actually been shipped and include rubber from the free stocks in Singapore and Penang. (2) Exports of domestic produce. (3) Exclusive of Liberia. Notes: Figures shown prior to 1940 were furnished by the United States Department of Commerce. Figures since 1940 were furnished by the International Rubber Regulation Committee, which accounts for the difference in the principal producing countries shown. Many figures for current months are provisional only and are later revised when more definite statistics are available. Therefore, it is suggested that figures from the most recent issue should be taken as more reliable.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ee)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	73	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	2,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,968	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,400	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,439	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,296	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,321	11,391	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	37,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1939	486,348				31,615	42,352			15,426	9,612	7,051				
1940	811,564														
1940:															
Feb.	41,797	7,500	5,000*	....	3,508	5,241	1,500*	2,000*	1,846	694	495	1,200*	200*	....	....
Mar.	58,302	14,200	5,000*	....	3,062	6,057	1,500*	2,000*	1,784	....	627	1,200*	200*	....	....
Apr.	70,135	16,400	5,000*	....	3,096	2,000*	1,500*	2,000*	1,612	....	....	1,200*	200*	....	....
May	50,610	10,000	5,000*	....	3,108	2,500*	1,500*	2,000*	2,128	....	....	1,200*	200*	....	....
June	53,266	9,500	5,000*	....	1,062	3,000*	1,500*	2,000*	1,181	....	....	1,200*	200*	....	....
July	69,496	19,500	5,000*	....	5,112	3,000*	1,500*	2,000*	1,902	....	....	1,200*	200*	....	....
Aug.	72,612	21,250	5,000*	....	4,605	4,500*	1,500*	2,000*	2,508	....	....	1,200*	200*	....	....
Sept.	78,306	25,940	5,000*	....	2,743	....	1,500*	2,000*	2,485	....	....	1,200*	200*	....	....
Oct.	74,400	.....	5,000*	....	3,336	....	1,500*	2,000*	590	....	....	1,200*	200*	....	....
Nov.	72,775	.....	5,000*	....	5,451	....	1,500*	2,000*	1,366	....	....	1,200*	200*	....	....
Dec.	97,794	.....	5,000*	....	7,437	....	1,500*	2,000*	721	....	....	1,200*	200*	....	....
1941:															
Jan.	86,541	.....	5,000*	....	6,290	....	1,500*	2,000*	1,065	....	....	1,200*	200*	....	....
Feb.	73,647	.....	5,000*	....	3,770	....	1,500*	2,000*	1,717	....	....	1,200*	200*	....	....
Mar.	86,794	.....	5,000*	....	3,879	....	1,500*	2,000*	3,486	....	....	1,200*	200*	....	....
Apr.	63,071	.....	5,000*	....	2,531	....	1,500*	2,000*	2,326	....	....	1,200*	200*	....	....
May	101,034	.....	5,000*	....	5,596	....	1,500*	2,000*	1,549	....	....	1,200*	200*	....	....
June	64,101	.....	5,000*	....	2,818	....	1,500*	2,000*	1,373	....	....	1,200*	200*	....	....
July	96,681	.....	5,000*	....	4,143	....	1,500*	2,000*	....	....	....	1,200*	200*	....	....
Aug.	106,139	.....	5,000*	....	....	....	1,500*	2,000*	....	....	....	1,200*	200*	....	....
Sept.	81,343	.....	....	....	....	....	....	.....	....	....	....	.....	....	....	....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. :—United States imports of guayule are included in this compilation. *—Figure is provisional: final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

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The Market Place

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Rubber Service Division
1012 Second National Bldg., Akron, Ohio

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